

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS

OF THE SOCIETY

December 17th, 1913.—The meeting was called to order at 8.30 p. m.; Vice-President J. Waldo Smith in the chair; Chas. Warren Hunt, Secretary; and present, also, 197 members and 33 guests.

A paper by John W. Alvord, M. Am. Soc. C. E., entitled "The Depreciation of Public Utility Properties as Affecting Their Valuation and Fair Return," was presented in abstract by the Secretary, who also read a communication on the subject from W. J. Wilgus, M. Am. Soc. C. E. Owing to lack of time, discussions by Messrs. J. E. Willoughby, Frank C. Boes, Allen Hazen, H. C. Vensano, and Leonard Metcalf, were read by title only. The paper was discussed orally by Messrs. Alexander C. Humphreys, F. Lavis, Henry Floy, and Charles Rufus Harte.

A paper by Allen Hazen, M. Am. Soc. C. E., entitled "Storage to be Provided in Impounding Reservoirs for Municipal Water Sup-

ply," was presented by the author, and the subject was discussed by T. U. Taylor, M. Am. Soc. C. E.

The Secretary announced the following deaths:

ULYSSES STANISLAUS LUTZ, of New York City, elected Member, March 5th, 1912; died December 8th, 1913.

HENRY SHOTWELL WOOD, of New York City, elected Member, May 1st, 1907; died December 6th, 1913.

GEORGE GERE MACCRACKEN, of New York City, elected Junior, February 5th, 1901; Associate Member, February 3d, 1904; died August 1st, 1913.

ALFRED G. COMPTON, of New York City, elected Associate, September 5th, 1877; died December 12th, 1913.

HENRY HELM CLAYTON, of Kirkwood, Mo., elected Junior, December 3d, 1907; died April, 1913.

HENRY A. RICHMOND, of Buffalo, N. Y., elected Fellow, July 7th, 1870; died May 10th, 1913.

Adjourned.

January 7th, 1914.—The meeting was called to order at 8.30 P. M.; Vice-President J. Waldo Smith in the chair; Chas. Warren Hunt, Secretary; and present, also, 223 members and 36 guests.

The minutes of the meetings of November 19th, and December 3d, 1913, were approved as printed in *Proceedings* for December, 1913.

A paper by A. H. Sabin, Assoc. M. Am. Soc. C. E., entitled "Painting Structural Steel: The Present Situation," was presented by the author, and the subject was discussed by Messrs. H. A. Gardner and A. W. Carpenter (who illustrated their remarks with lantern slides), Maximilian Toch, R. D. Coombs, L. D. Rights, and the author. The Secretary read communications on the subject from Messrs. Allerton S. Cushman and Samuel Tobias Wagner.

The Secretary announced that the following members of the Society had been appointed by the Board of Direction as a Special Committee to Report on Stresses in Railroad Track: A. N. Talbot, Chairman, A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Emil Gerber, Robert W. Hunt, George W. Kittredge, William McNab, G. J. Ray, F. E. Turneure, and J. E. Willoughby.

The Secretary announced the election of the following candidates on December 31st, 1913:

AS MEMBERS

EDGAR ALCANDER BAYLEY, Los Angeles, Cal.

JOHN WILLIAM BERNARD BLACKMAN, New Westminster, B. C.,
Canada

SAMUEL CECIL CODDINGTON, North Milwaukee, Wis.

ERIC GUSTAF ERICSON, Pittsburgh, Pa.
PERCIVAL HERBERT EVERETT, Los Angeles, Cal.
FREDERICK WALDO GAY, San Francisco, Cal.
ELBERT BRUTUS GORE, Austin, Tex.
FREDERIC FRANCIS HALL, Berkeley, Cal.
GEORGE ALLEN LEE, Bluff, New Zealand
ARTHUR WOODROFFE MANTON, New York City
CHARLES ROGERS SHEPLEY, Minneapolis, Minn.
CHARLES CHURCHILL SMALL, Rock, Mass.
WILLIAM HOOK WOODBURY, Kamloops, B. C., Canada

AS ASSOCIATE MEMBERS

MILTON JEWELL ADAMS, Hilo, Hawaii
HUNTINGTON CLARK ATWATER, New York City
JESSEE GARNET BECKJORD, Manila, Philippine Islands
WALTER LACY BOYD, Bartow, Fla.
CECIL SPENCER BUMANN, San Francisco, Cal.
FRANK EPHRAIM CHESLEY, Beaver Falls, Pa.
EMMERT LUTHER COLE, Baltimore, Md.
ROY WINCHESTER CRUM, Ames, Iowa
DANIEL ABRAHAM DEAN, Boston, Mass.
HOWELL LEWIS FRY, São Paulo, Brazil
SEWARD DANIEL HENDRICKS, Buffalo, N. Y.
WASHINGTON BART LEWIS, Washington, D. C.
LESLIE BROWN LOOMIS, Chatham, N. J.
JOSEPH PATRICK MARTIN, Ogden, Utah
ALEXANDER NORMAN MILLER, Denver, Colo.
HERBERT WARNER OLMSTED, Pleasantville, N. Y.
FRANK EDGAR OSBORN, Muncie, Ind.
CHARLES ROLLO POWRIE, Waycross, Ga.
ROBERT HENRY RENSHAW, Jr., Preston, Md.
FRANK W SANSOM, Joplin, Mo.
EDWARD HAYNES SARGENT, Albany, N. Y.
EMIL MUNGER SCHNECK, Greenfield, Mass.
FREDERICK DIAL STAFFORD, Guild, Tenn.
CLARENCE McNAUGHTON STEEVES, St. John, N. B., Canada
EARLE EVERETT TEETER, Anthony, N. Mex.

AS JUNIORS

WALTER COX BOWEN, New Brunswick, N. J.
CHARLES CECIL CAMPBELL, Philadelphia, Pa.
ALBERT PETER VINCENT DALY, New York City
WALTER RHODES DRURY, Flint, Mich.
HARVEY TIMLOW MUNN, Syracuse, N. Y.
FREDERICK WILLIAM OCKERT, New York City

MANLEY OSGOOD, Ann Arbor, Mich.
HAROLD CROSBY STEVENS, Charlotte, N. C.
MARION ROSS WATSON, Boca Grande, Fla.
CHAUNCEY EARL WEBB, Fort Shaw, Mont.
LIANG YU, Chicago, Ill.

The Secretary announced the transfer of the following candidates on December 31st, 1913:

FROM ASSOCIATE MEMBER TO MEMBER

HAROLD SHERBURNE BOARDMAN, Orono, Me.
FRANK COLBURN BOWLER, Millinocket, Me.
ALBERT VALDEMAR GUDE, Jr., Atlanta, Ga.
LINN MURDOCH HUNTINGTON, New York City
JOHN ROBERT CLARKE MACREDIE, Prussia, Saskatchewan, Canada
WILLIAM CLARE SPIKER, Atlanta, Ga.
FRED CASWELL STANTON, Cristobal, Canal Zone, Panama

FROM ASSOCIATE TO ASSOCIATE MEMBER

DAVID WALKER BROOKS, New York City

FROM JUNIOR TO ASSOCIATE MEMBER

PAUL JONES BEAN, Pearl Harbor, Hawaii
CHARLES SMITH BILYEU, New York City
LEON GEORGE CUTLER, New York City
ARTHUR WILLIAM HARRINGTON, Potsdam, N. Y.
THEODORE SEDGWICK JOHNSON, Granville, Ohio
FREDERIC WILLIAM LYON, Pittsburgh, Pa.
CHARLES REED MARSH, Johnstown, Pa.
JAMES ELWOOD PAYNE, Youngstown, Ohio
HUBERT EARL SNYDER, Logan, West Va.
ALBERT IRVINE STILES, Barrios, Guatemala

The Secretary announced the following deaths:

ROBERT COOKE CLARKSON, of Philadelphia, Pa., elected Junior, January 5th, 1887; Member, January 2d, 1901; died December 26th, 1913.

JOSEPH P. COTTON, of Newport, R. I., elected Member, June 7th, 1876; died December 13th, 1913.

HENRY FRANCIS LABELLE, of Albuquerque, N. Mex., elected Member, April 6th, 1898; died December 12th, 1913.

JOHN WILEY MILES, of City of Mexico, Mexico, elected Associate Member, October 2d, 1901; Member, April 6th, 1909; died in January, 1912.

MURRAY FORBES, of Greensburg, Pa., elected Associate Member, June 5th, 1907; died December 28th, 1913.

HARRY WOX GRAY, of Los Angeles, Cal., elected Associate Member, November 1st, 1910; died December 14th, 1913.

JOHANNES CORNELIS Vliegenthart, of Delft, Holland, elected Associate Member, June 5th, 1907; died in October, 1913.

Adjourned.

OF THE BOARD OF DIRECTION

(Abstract)

December 31st, 1913.—Vice-President Churchill in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bates, Bush, Cain, Clarke, Edwards, Hodge, Leonard, Ridgway, and Snow.

Details of the Report of the Board of Direction to the Society were discussed.

A Report was received from the Committee appointed to Recommend the Award of Medals and Prizes, Messrs. Charles M. Spofford, Daniel W. Mead, and Walter Loring Webb, and the Board awarded the Prizes as follows:

The Norman Medal to Paper No. 1235, entitled "Air Resistances to Trains in Tube Tunnels," by J. V. Davies, M. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 1231, entitled "The Laramie-Poudre Tunnel," by Burgis G. Coy, Assoc. M. Am. Soc. C. E.

The J. James R. Croes Medal to Paper No. 1222, entitled "The Problem of the Lower West Side Manhattan Water-Front of the Port of New York," by B. F. Cresson, Jr., M. Am. Soc. C. E.

The James Laurie Prize to Paper No. 1218, entitled "Construction of the Morena Rock Fill Dam, San Diego County, California," by M. M. O'Shaughnessy, M. Am. Soc. C. E.

Messrs. George W. Tillson, Nelson P. Lewis, and Charles J. Tilden, were appointed as additional members of the Special Committee on Bituminous Materials for Road Construction.

Action was taken in regard to members in arrears for dues.

The Constitution adopted by the Texas Association of Members of the Society was approved by the Board.

The resignations of 7 Members, 7 Associate Members, 3 Associates, and 8 Juniors, were accepted.

Ballots for membership were canvassed, resulting in the election of 13 Members, 25 Associate Members, and 11 Juniors, and the transfer of 10 Juniors to the grade of Associate Member.

Seven Associate Members were transferred to the grade of Member, and one Associate was transferred to the grade of Associate Member.

Applications were considered, and other routine business transacted.

Adjourned.

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

February 4th, 1914.—8.30 P. M.—A regular business meeting will be held. A paper by Edward Flad, M. Am. Soc. C. E., entitled "Reinforced Concrete Reservoir and Coagulation Plant at St. Louis, Mo.," will be presented for discussion, and George W. Tillson, M. Am. Soc. C. E., will address the meeting on "Some Observations on Pavements in Foreign Cities."

Mr. Flad's paper was printed in *Proceedings* for December, 1913.

February 18th, 1914.—8.30 P. M.—Two papers will be presented for discussion at this meeting, as follows: "Grouted Cut-Off for the Estacada Dam," by Harold A. Rands, Assoc. M. Am. Soc. C. E.; and "Diversion of Irrigating Water from Arizona Streams," by A. L. Harris, Assoc. M. Am. Soc. C. E.

These papers are printed in this number of *Proceedings*.

SPECIAL COMMITTEE TO REPORT ON STRESSES IN RAILROAD TRACK

At the Society meeting of June 4th, 1913, the following motion was offered:

"That it is the sense of this meeting that the American Society of Civil Engineers should appoint a Special Committee to act jointly with the American Railway Engineering Association in studying and experimenting on the stresses in railroad rails, ties, etc."

This motion was referred to the Board of Direction.

The Board has appointed the following Committee:

A. N. TALBOT, *Chairman,*

A. S. BALDWIN,

J. B. BERRY,

G. H. BREMNER,

JOHN BRUNNER,

W. J. BURTON,

CHARLES S. CHURCHILL,

W. C. CUSHING,

EMIL GERBER,

ROBERT W. HUNT,

GEORGE W. KITTREDGE,

WILLIAM McNAB,

G. J. RAY,

F. E. TURNEAURE,

J. E. WILLOUGHBY.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In reference to this work, the Appendices* to the Annual Reports of the Board of Direction for the years ending December 31st, 1906, and December 31st, 1910, contain summaries of all searches made to date.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions, only, will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

**Proceedings*, Vol. XXXIII, p. 20 (January, 1907); Vol. XXXVII, p. 28 (January, 1911).

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Friday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., M. Am. Soc. C. E., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

Colorado Association

The meetings of the Colorado Association of Members of the American Society of Civil Engineers are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, Roger W. Toll, Assoc. M. Am. Soc. C. E., 700 Tramway Building, Denver, Colo. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Visiting members are urged to attend the meetings.

Atlanta Association

On March 14th, 1912, the Atlanta Association of Members of the American Society of Civil Engineers was organized, with the following officers: Arthur Pew, President; William A. Hansell, Jr., Secretary; and Messrs. James N. Hazlehurst and B. M. Hall, Members of the Executive Committee. The Association will hold its meetings in the house of the University Club.

Philadelphia Association

On December 22d, 1913, the Philadelphia Association of Members of the American Society of Civil Engineers was organized, with the following officers: George S. Webster, President; Richard L. Humphrey and F. Herbert Snow, Vice-Presidents; J. W. Ledoux, Edgar Marburg, and H. S. Smith, Directors; S. M. Swaab, Treasurer; and W. L. Stevenson, Secretary. The meetings of the Association will be held at the Engineers' Club of Philadelphia, 1317 Spruce Street.

Portland, Ore., Association

On June 18th, 1913, the Portland, Ore., Association of Members of the American Society of Civil Engineers was organized with the following officers: E. G. Hopson, President; W. S. Turner, First Vice-President; D. D. Clarke, Second Vice-President; G. B. Hegardt, Treasurer; and Charles J. McGonigle, Secretary.

Seattle Association

On June 30th, 1913, the Seattle Association of Members of the American Society of Civil Engineers was organized with the following officers: Samuel H. Hedges, President; Ernest B. Hussey, Vice-President; and Joseph Jacobs, Secretary-Treasurer.

Southern California Association

At its meeting of December 3d, 1913, the Board of Direction considered and approved the proposed Constitution of the Southern California Association of Members of the American Society of Civil Engineers.

Texas Association

At its meeting of December 31st, 1913, the Board of Direction considered and approved the proposed Constitution of the Texas Association of Members of the American Society of Civil Engineers.

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Architekten-Verein zu Berlin, Wilhelmstrasse 92, Berlin W. 66, Germany.

Associação dos Engenheiros Cívis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 413 Dorchester Street, West, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniørforening, Amaliegade 38, Copenhagen, Denmark.

Engineers' and Architects' Club of Louisville, Ky., 303 Norton Building, Fourth and Jefferson Streets, Louisville, Ky.

Engineers' Club of Baltimore, Baltimore, Md.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis, Minn.

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Associação dos Engenheiros Cívis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 413 Dorchester Street, West, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniørforening, Amaliegade 38, Copenhagen, Denmark.

Engineers' and Architects' Club of Louisville, Ky., 303 Norton Building, Fourth and Jefferson Streets, Louisville, Ky.

Engineers' Club of Baltimore, Baltimore, Md.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis, Minn.

Engineers' Club of Philadelphia, 1317 Spruce Street, Philadelphia, Pa.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Toronto, 96 King Street, West, Toronto, Ont., Canada.

Engineers' Society of Northeastern Pennsylvania, 415 Washington Avenue, Scranton, Pa.

Engineers' Society of Pennsylvania, 219 Market Street, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania, 2511 Oliver Building, Pittsburgh, Pa.

Institute of Marine Engineers, 58 Romford Road, Stratford, London, E., England.

Institution of Engineers of the River Plate, Buenos Aires, Argentine Republic.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

Koninklijk Instituut van Ingenieurs, The Hague, The Netherlands.

Louisiana Engineering Society, Room 6, City Bank and Trust Company Building, New Orleans, La.

Memphis Engineering Society, Memphis, Tenn.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Montana Society of Engineers, Butte, Mont.

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Oesterreichischer Ingenieur- und Architekten-Verein, Eschenbachgasse 9, Vienna, Austria.

Pacific Northwest Society of Engineers, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sachsischer Ingenieur- und Architekten-Verein, Dresden, Germany.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 Rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkobergsgator 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18-1, Copenhagen, Denmark.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1913.

In compliance with the Constitution, the Board of Direction presents its report for the year ending December 31st, 1913.

MEMBERSHIP

The changes in membership are shown in the following table:

| | JAN. 1st, 1913. | | | JAN. 1st, 1914. | | | LOSSES. | | | | ADDI- TIONS. | | TOTAL. | | |
|-----------------------------|-----------------|---------------|--------|-----------------|---------------|--------|-----------|--------------|----------|--------|-----------------|-----------|--------|-------|-----------|
| | Resident. | Non-Resident. | Total. | Resident. | Non-Resident. | Total. | Transfer. | Resignation. | Dropped. | Death. | Transfer. | Election. | Loss. | Gain. | Increase. |
| Honorary Members..... | 7 | 7 | 7 | 5 | 5 | 5 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 2 |
| Corresponding "Members..... | 633 | 2 432 | 3 065 | 648 | 2 627 | 3 275 | 1 13 | 9 39 | | | *125 | \$147 | 62 | 272 | 210 |
| Associate Members..... | 518 | 2 178 | 2 691 | 547 | 2 437 | 2 984 | 120 | 15 | 11 | 13 | +114 | +388 | 159 | 452 | 293 |
| Associates..... | 76 | 103 | 179 | 77 | 97 | 174 | 7 | 4 | 1 | 3 | 3 | 7 | 15 | 10 | 5 |
| Juniors..... | 156 | 658 | 814 | 156 | 660 | 816 | 115 | 13 | 19 | 2 | 151 | 149 | 151 | 2 | 2 |
| Fellows..... | 7 | 12 | 19 | 5 | 12 | 17 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Totals..... | 1 385 | 5 392 | 6 777 | 1 433 | 5 839 | 7 272 | 243 | 45 | 40 | 63 | 243 | 643 | 391 | 886 | 495 |

* 120 Associate Members and 5 Associates.

‡ 2 Reinstatements.

† 2 Associates and 112 Juniors.

++ Includes 9 Juniors dropped on account age limit in 1912 and 2 Reinstatements.

‡ 3 Juniors.

‡ Decrease.

It will be noted that the net increase in membership for the year is 495.

The number of applications received during 1913 was 1096: 803 for admission, and 293 for transfer.

The losses by death reported during the year number 63, and are as follows:

Honorary Members (3): John Fritz, George Edward Gray, Sir William Henry White.

Corresponding Member (1): Ernest Pontzen.

Members (39): Arthur Lincoln Adams, Peter Suther Archibald, James Richard Bell, Adolphus Bonzano, Albert Safford Cheever, Philip Henry Coombs, Samuel Lisenard Cooper, Frederic Danforth, John Butler Dunklee, Griffith Morgan Eldridge, Rudolph Fink, John Douglas Fouquet, George Blinn Francis, William Gaston Hamilton, James Charles Haugh, Horace Theophilus Herrick, Franklin Allen Hinds, Ned Herbert Janvrin, Charles Kellogg, Emil Edward Kuersteiner, Henry Francis Labelle, Francis Valentine Toldervy Lee,

Ulysses Stanislaus Lutz, David Ernest Melliss, John Wiley Miles, Alonzo Tyler Mosman, George Browne Post, William Napier Raden-hurst, Charles Walker Raymond, James Ross, Robert Wilson Sayles, Baird Snyder, Jr., Frank Soulé, David McNeely Stauffer, Henry William Vehrenkamp, Ebenezer Smith Wheeler, Henry Shotwell Wood, Emanuel Alois Ziffer, Luther Reese Zollinger.

Associate Members (13): Charles De La Plane Atterbury, James Marcus Bandy, Arthur Garfield Crysler, John Stuart Elliott, Harry Woy Gray, Henry Alexander Harris, George Gere MacCracken, Horace Guy Merrick, William Belden Reed, Jr., Charles Spearman, Charles Harry Tisdale, Alberto de la Torre, Johannes Cornelis Vliegenthart.

Associates (3): Samuel Stockton Bogart, Alfred G. Compton, John MacGregor.

Juniors (2): Henry Helm Clayton, Orloff Lake.

Fellows (2): Henry A. Richmond, James Watson.

LIBRARY

The total contents of the Library and the increase during the year, are shown in the following statement:

| | Total Contents. | Increase during 1913. |
|-------------------------------------|--------------------|--------------------------|
| Bound volumes..... | 23 357 | 1 450 |
| Unbound volumes..... | 44 405 | 2 273 |
| Specifications | 7 420 | 223 |
| Maps, photographs and drawings..... | 4 674 | 76 |
| Total | 79 856 | 4 022 |

Of these, 1732 were donations received in answer to special requests; 91 were donations from publishers; 1867 were donations received in regular course, and 332 were purchased.

The value of accessions to the Library during the year is as follows, each accession having been valued separately as received:

| | |
|--|------------|
| Donations and exchanges (estimated value)... | \$2 625.70 |
| 332 volumes purchased (cost)..... | 1 004.86 |
| Binding 428 volumes..... | 496.63 |
| Total | \$4 127.19 |

The following amounts have been expended upon the Library during the year:

| | |
|---|------------|
| Purchases, subscriptions, and binding..... | \$1 501.49 |
| Fixtures, supplies, express charges, etc..... | 186.76 |
| Total | \$1 688.25 |

The card index now contains about 87 000 cards.

During the year 79 new bibliographies (containing 3 258 separate references) have been made, copies of 35 searches made in previous years have been furnished, 4 of these having been brought up to date. The total cost of this work, \$1 025.83, has been charged to those for whom it was undertaken.

The total attendance in the Reading Room and Library during the year, which shows a marked increase over that of previous years, was 4 887. This does not include those who use the Library during the semi-monthly meetings.

SPECIAL COMMITTEES

Much thought has been given during the year to the work of Special Committees appointed to report on Engineering Subjects. Some time ago the Constitution was amended, in order that, when expedient, Special Committees might be appointed promptly. Your Board, believing that through the work of such Committees the Society can enlarge its usefulness to the Profession, has appointed four new Special Committees during the year, and has indicated the willingness and ability of the Society to furnish greater financial aid to this work than has heretofore been possible.

The new Committees appointed were the following:

- To Codify Present Practice on the Bearing Value of Soils for Foundations.
- On A National Water Law.
- On Floods, Flood Prevention, and other Allied Subjects.
- On Stresses in Railroad Track.

In addition to these four Special Committees, there are six others previously appointed, from all of which Progress Reports have been received and issued to members during the year. These Committees are on the following subjects:

- On Concrete and Reinforced Concrete.
- On Engineering Education.
- On Steel Columns and Struts.
- On Bituminous Materials for Road Construction.
- On Valuation of Railroad Property and other Public Utilities.
- To Investigate Conditions of Employment of, and Compensation of, Civil Engineers.

PUBLICATIONS

During the year, ten numbers of *Proceedings*, one Volume of *Transactions*, and one List of Members, have been issued.

In *Proceedings* the list of references to current engineering literature has been continued, and has covered 160 pages and contained 7 206 classified references to 107 periodicals.

The stock of the various publications of the Society, kept on hand for the convenience of members and others, now amounts to 167 338 copies, the cost of which to the Society, for paper and press work only, has been \$25 612.41.

During the year, 4 595 volumes of *Transactions* have been bound for members and others in standard half-morocco and cloth bindings.

SUMMARY OF PUBLICATIONS FOR 1913.

| | Issues. | Average Edition. | Total Pages. | Plates. | Cuts. |
|---|---------|------------------|--------------|---------|-------|
| <i>Transactions</i> (Volume LXXVI) .. | 1 | 7 700 | 2 302 | 76 | 655 |
| <i>Proceedings</i> (Monthly numbers) .. | 10 | 7 625 | 3 184 | 104 | 497 |
| Constitution and List of Members. | 1 | 7 850 | 296 | | 1 |
| Total | 12 | | 5 782 | 180 | 1 153 |

The cost of publications has been:

| | |
|--|-------------|
| For Paper, Printing, etc., <i>Transactions</i> and <i>Proceedings</i> | \$38 698.05 |
| For Plates and Cuts..... | 3 964.16 |
| For Boxes, Mailing Lists, Copyright, and Sundry Expenses.... | 667.56 |
| For 41 150 Extra Copies of Papers and Memoirs..... | 2 106.31 |
| For List of Members..... | 1 964.84 |

Total \$47 400.92

Deduct amount received from sale of publications..... 4 908.46

Net expenditure for publications for 1913..... \$42 492.46

Volume LXXVI of *Transactions* issued in December, 1913, has been received by the Membership with much favorable comment. It is the second of the yearly volumes printed on Bible paper, and contains 2 300 pages. The advantages of this form of publication over that which necessitated the issue of four volumes for the same amount of material—viz.: the saving of shelf room, one index instead of four, greater length of time which can be allowed for closing of discussions, economy to members in binding and to the Society in postage, have been indicated in previous reports.

Beginning with the April Number, the *Proceedings* have also been printed on a thin paper, and the advantages of this change have also been evident. It will be noted that the average number of pages in each number is 318 and that some issues are much larger even than this. When printed on the heavier paper a pamphlet of from 350 to 400 pages becomes a volume which is too bulky and heavy for convenient handling.

MEETINGS

Twenty-six meetings were held during the year, as follows: At the Annual Meeting, 1; at the Annual Convention, 3; and 22 other meetings, 21 of which were held at the Society House.

The experiment of holding one of the regular meetings at a point outside of the Resident District was tried, and the meeting scheduled for October 15th, held in New Orleans, La., was a success in every way.

At these meetings there were presented 29 formal papers, 6 of which were illustrated with lantern slides. There were also 12 papers published which were not presented for discussion at any meeting of the Society. The number of members and others who took part in the preparation or discussion of these papers was 275.

The Forty-fifth Annual Convention was held at Ottawa, Ont., Canada.

The total attendance at the 26 meetings held was about 5 220. The registered attendance at the Annual Meeting was more than 1 200, at the Annual Convention 138, at the New Orleans Meeting 121 (includes members only), but there were many guests present at all these meetings, and also Members who failed to register.

At each of the ordinary semi-monthly meetings held during the year Collations have been served, and these have been paid for out of the Society Funds, in accordance with the action of the Annual Meeting of 1912.

MEDALS AND PRIZES

For the year ending with the month of July, 1912, prizes were awarded as follows:

The Norman Medal to Wilson Sherman Kinnear, M. Am. Soc. C. E., for his paper entitled "The Detroit River Tunnel."

The Thomas Fitch Rowland Prize to Eugene Klapp and W. J. Douglas, Members, Am. Soc. C. E., for their paper entitled "Reinforced Concrete Bridge Across the Almendares River, Havana, Cuba."

The Collingwood Prize for Juniors to W. W. Clifford, Jun. Am. Soc. C. E., for his paper entitled "A Reinforced Concrete Stand-Pipe."

FINANCES

The mortgage debt of the Society has been reduced during the year \$35 000, from \$115 000 to \$80 000, and the Reserve Fund now consists of \$80 000 (par value) New York City Bonds, on which the interest received is a little more than that paid on the mortgage, therefore the Society may be said to be for the first time out of debt.

Appended to this Report are diagrams showing for the last 32 years the following: Total Membership; Total Number of Pages Published; Total Salaries; Cost of Publications; Receipts for Publica-

tions; Expenditures Charged to Library; Receipts per Member; Expenditures per Member; Total Salaries per Member; Net Cost of Publications per Page per Member; and a general curve showing the Ratio of Expenditures to Receipts.

The attention of members is invited to the Secretary's statement of receipts and disbursements, and to the general balance sheet which accompanies it, in which the financial condition of the Society is shown.

The reports of the Secretary and Treasurer are appended.

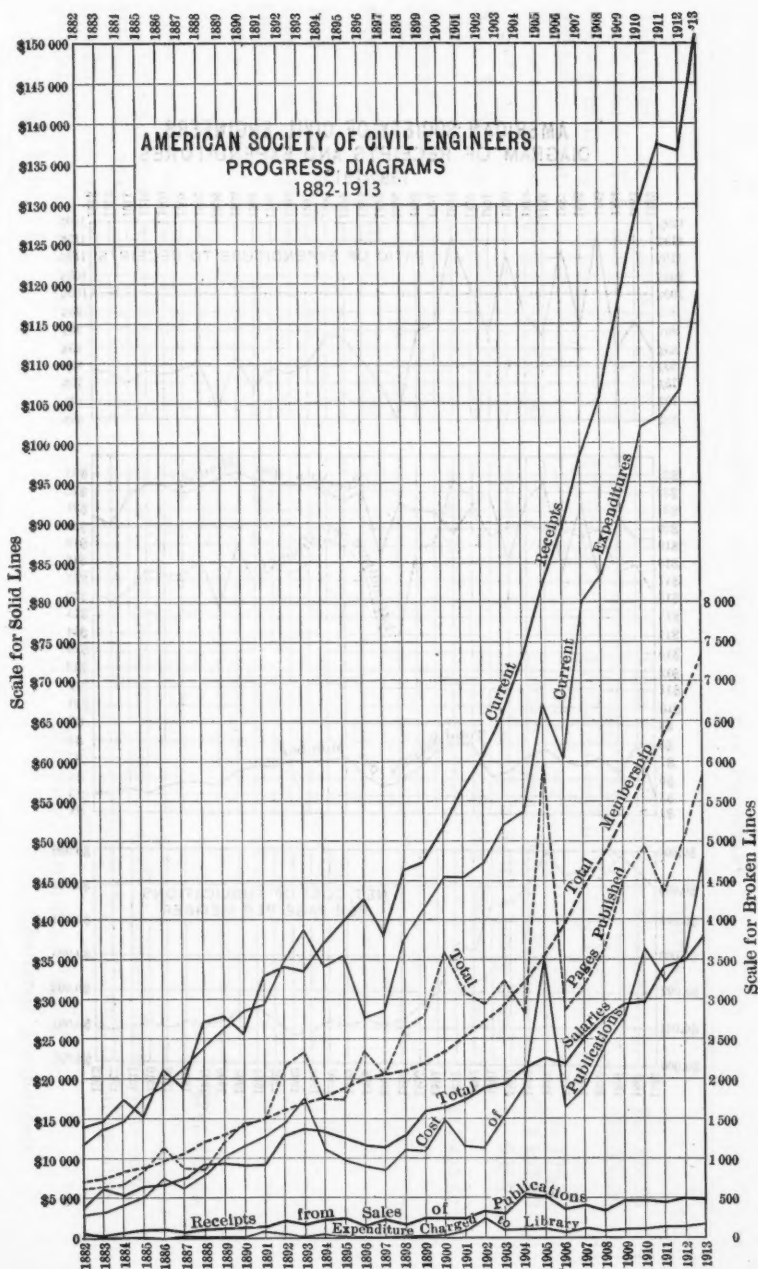
By order of the Board of Direction.

CHAS. WARREN HUNT,
Secretary.

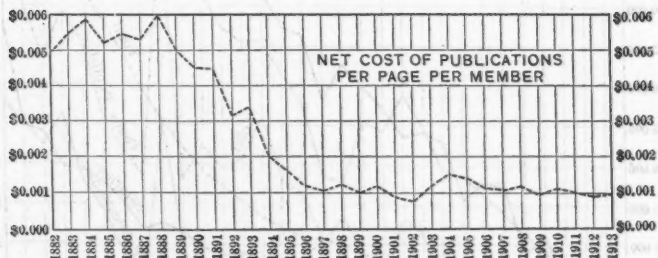
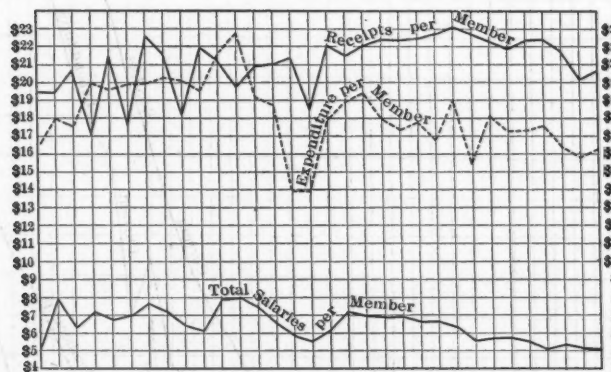
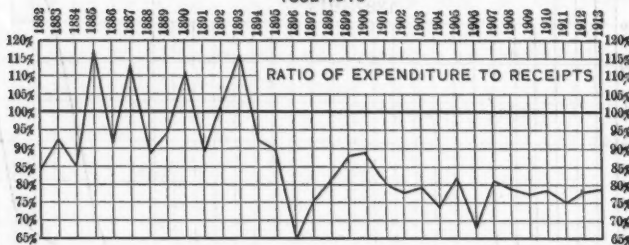
JANUARY 7TH, 1914.

MEMBERS AND FINANCE

FINANCIALS



AMERICAN SOCIETY OF CIVIL ENGINEERS DIAGRAM OF RECEIPTS AND EXPENDITURES 1882-1913



*Compounding Dues Fund, \$10 930.00; Norman Medal Fund, \$2 000.00; Fund, \$1 000.00; Fellowship Fund, \$13 038.28.

January, 1914]

GENERAL BALANCE SHEET, DECEMBER 31ST, 1913.
ACCOMPANYING THE REPORT OF THE SECRETARY.

| ASSETS. | | LIABILITIES. | |
|--|---------------------|--|---------------------|
| Three Lots (Actual cost, \$189 632.11) (Estimated Value)..... | \$375 000.00 | Dues for 1914 paid in advance..... | \$30 326.25 |
| Society Building (cost)..... | 170 955.59 | Mortgage Debt and Loan..... | 80 000.00 |
| Furniture (cost)..... | 20 663.60 | Funds invested in Society House, Lots and Library*..... | 27 190.75 |
| Publications on hand (inventoried cost)..... | 25 612.41 | Herbert Stewart Library Fund..... | 1 997.50 |
| New York City Non-Taxable Bonds (cost)..... | 80 425.00 | Gen. Joseph G. Swift Library Fund.. | 998.75 |
| Library: Cash expended for books, etc..... | \$18 626.84 | Surplus (including Reserve Fund of \$77 428.75)..... | 644 829.57 |
| Donations (estimated)..... | 84 060.53 | | |
| Due from Members..... | 9 475.94 | | |
| Due from Non-Members..... | 716.35 | | |
| Cash..... | 18 433.43 | | |
| | <u>\$785 342.85</u> | | <u>\$785 342.85</u> |

We have examined the books and accounts of the American Society of Civil Engineers, for the year ended December 31, 1913, and certify that the foregoing Balance Sheet is in accordance therewith, and, in our opinion, correctly states the condition of the Society's affairs, as shown by the books.

79 WALL STREET, NEW YORK.

JANUARY 7TH, 1914.

MARWICK, MITCHELL, PEAT & Co.,

Chartered Accountants.

*Compounding Dues Fund, \$10 930.00; Norman Medal Fund, \$1 000.00; Rowland Prize Fund, \$1 222.50; Collingwood Prize Fund, \$1 000.00; Fellowship Fund, \$13 038.28.

REPORT OF THE SECRETARY FOR THE

TO THE BOARD OF DIRECTION OF THE

GENTLEMEN:—I have the honor to present a statement of Receipts 31st, 1913. I also append a general balance sheet showing the condition

RECEIPTS.

| | |
|---|-------------|
| Balance on hand December 31st, 1912, in Bank, Trust Company, and in hands of Treasurer..... | \$44 074.04 |
| Entrance Fees | \$16 680.00 |
| Current Dues..... | 78 971.31 |
| Past Dues..... | 3 277.18 |
| Advance Dues..... | 30 326.25 |
| Certificates of Membership..... | 754.30 |
| Badges | 3 385.50 |
| Sales of Publications..... | 4 908.46 |
| Library | 672.13 |
| Annual Meeting..... | 798.65 |
| Binding | 6 489.36 |
| Interest | 4 509.03 |
| Miscellaneous | 311.33 |
| | <hr/> |
| | 151 083.50 |

\$195 157.54

YEAR ENDING DECEMBER 31st, 1913.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

and Disbursements for the fiscal year of the Society, ending December of the affairs of the Society.

Respectfully submitted,

CHAS. WARREN HUNT.

Secretary.

DISBURSEMENTS.

| | | |
|--|-------------|---------------------|
| Salaries of Officers..... | \$14 550.00 | |
| Mileage of Directors..... | 948.96 | |
| Mileage of Nominating Committee..... | 618.90 | |
| Work of Committees..... | 793.67 | |
| Clerical Help..... | 21 192.82 | |
| Caretaking | 1 905.24 | |
| Publications | 47 400.92 | |
| Postage | 7 376.40 | |
| General Printing and Stationery..... | 4 119.07 | |
| Library | 1 501.49 | |
| Library Maintenance | 186.76 | |
| Badges | 2 330.25 | |
| Certificates of Membership..... | 569.60 | |
| Binding | 3 210.46 | |
| Prizes | 443.05 | |
| Annual Convention | 391.12 | |
| Annual Meeting..... | 1 818.00 | |
| Maintenance of House..... | 700.49 | |
| Heat, Light, and Water..... | 867.53 | |
| Betterments | 118.30 | |
| Furniture | 552.95 | |
| Interest | 4 321.80 | |
| Insurance | 290.00 | |
| Current Business | 2 562.39 | |
| Petty Expenses..... | 215.71 | |
| International Engineering Congress, 1915.... | 2 730.06 | |
| Advanced on Members' Accounts..... | 20.67 | |
| Bond and Mortgage (Payment on Principal)... | 35 000.00 | |
| Reserve Fund (Purchase of Bonds)..... | 19 987.50 | |
| | | \$176 724.11 |
| Balance on hand December 31st, 1913: | | |
| In Union Trust Company..... | \$10 158.57 | |
| In Garfield National Bank..... | 6 774.86 | |
| In hands of Secretary..... | 1 500.00 | |
| | | 18 433.43 |
| | | \$195 157.54 |

REPORT OF THE TREASURER.

In compliance with the provisions of the Constitution, I have the honor to present the following report for the year ending December 31st, 1913:

| | | |
|--|--------------|--------------|
| Balance on hand December 31st, 1912..... | \$44 074.04 | |
| Receipts from current sources, January 1st to December 31st, 1913 | 151 083.50 | |
| Payment of Audited Vouchers for Current Business, January 1st to December 31st, 1913 | \$121 736.61 | |
| Payment on principal of bond and mortgage..... | 35 000.00 | |
| Purchase of bonds, Reserve Fund..... | 19 987.50 | |
| Balance on hand December 31st, 1913: | | |
| In Union Trust Company.... | \$10 158.57 | |
| In Garfield National Bank.... | 6 774.86 | |
| In hands of the Secretary..... | 1 500.00 | 18 433.43 |
| | | <hr/> |
| | \$195 157.54 | \$195 157.54 |

Respectfully submitted,

JOHN F. WALLACE,
Treasurer.

NEW YORK, JANUARY 7TH, 1914.

ACCESSIONS TO THE LIBRARY

(From December 2d, 1913, to January 5th, 1914)

DONATIONS*

SEWER DESIGN.

By H. N. Ogden, M. Am. Soc. C. E. Second Edition. Cloth, $9\frac{1}{4} \times 6$ in., illus., 13 + 248 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1913. \$2.00.

The first edition of this work was issued fifteen years ago, and represented a course of lectures given by the author in the College of Civil Engineering at Cornell University. The book has been used since that time by the author in his classes, and although, as a whole, the subject-matter has not been materially changed in this, the second edition, certain errors, it is said, have been corrected and additions have been made in order to bring it up to present practice. It contains, it is stated, all the essentials of sewer design for a general course in Civil Engineering arranged so as to be readily intelligible to the average student. At the end of each chapter problems relating to the subject discussed in that chapter are given, in order that the student may apply his theory to concrete examples. Numerous references are also given to original papers in connection with the several subjects. The Chapter headings are: General Considerations; Preparatory Maps and Data; Excessive Rains; Proportion Reaching the Sewers; Relation of Density to Percentage; Mathematical Formulas; Estimating Future Population; Amount of Sewage per Capita; Ground-Water Reaching Sewers; Grades and Self-Cleansing Velocities; Development of Formulas for Flow; Kutter's Formula; Sewer Diagrams; Use of Diagrams; Sewer Plans; Sewer Cross-Sections; Flushing; Use of Tanks; Index.

THE GAS-ENGINE HANDBOOK:

A Manual of Useful Information for the Designer and the Engineer. By E. W. Roberts. Seventh Edition, Entirely Rewritten and Enlarged. Morocco, $7 \times 4\frac{1}{2}$ in., illus., 315 pp. Cincinnati, Ohio, The Gas Engine Publishing Co., 1913. \$2.00.

The preface states that this Handbook has been written as an epitome of gas-engine practice, and is intended for use as a handy book of reference. As it is not an extended treatise on the subject, the author, it is said, has devoted the subject-matter to that which he has judged to be most useful and which he has had frequent occasion to look up himself. He has divided the book into three parts, in the first of which he describes methods and devices used in gas-engine practice, as well as motors for automobiles, boats, and aeroplanes. The second part is devoted to the design of gas engines. In this part the subject-matter has been brought up to date, and new formulas of design and new tables have been added. In the third part, the subjects of operation, testing, and selection are discussed, in which apparatus and methods are described and suggestions for the selection of engines for various requirements given. The Contents are: Part I, Descriptive: Introductory; Comparison of the Cycles; Gas-Engine Fuels; Mechanism of the Gas Engine; Valves; Gas Valves and Mixers; Carbureters and Gasoline Mixers; Oil Engine Vaporizers and Mixers; Make-and-Break Igniters; Jump-Spark Ignition; Miscellaneous Ignition Systems; Gas-Engine Governors; Starting Large Engines; Engines for Automobiles; Marine Motors; Aeronautical Motors; Lubrication. Part II, Design: The Indicator Diagram; General Dimensions; The Cylinder; Pistons, Rods and Shafts; Valves; Igniters; Frames and Bases; Flywheels; Governor Design; Balancing; Foundations; Mufflers; Two-Cycle Engines; Aeroplane Engines. Part III, Operation, Testing, Selection: Installation; Starting and Stopping; Care of Gas Engines; Troubles; Testing; Selection; Tables of Dimensions of Gas and Water Pipe; Areas and Circumferences of Circles; Strength of Materials; Specific Gravity of Metals; Index.

DESCRIPTIONS OF LAND:

A Text-Book for Survey Students. By R. W. Cantley. Cloth, $7\frac{1}{4} \times 5\frac{1}{2}$ in., illus., 9 + 89 pp. New York, The Macmillan Company, 1913. \$1.00.

In drafting a description of lands a surveyor must have, the Introduction states, a clear conception of what he has to describe, of the surveying operations involved,

*Unless otherwise specified, books in this list have been donated by the publishers.

and of the exact meaning of the words he is using, as interpreted by judicial decisions. He must also be able to express what he wishes to state clearly and accurately. As all students of surveying in Canada are required to pass an examination in "descriptions of land," and as all titles to land are based on the description contained in the deed, the author, it is said, has written this textbook with the hope that it will prove of use to such students in their examinations and aid them in formulating rules for writing the descriptions required. The Contents are: Descriptions Based on Actual Survey; Descriptions Must Refer to Plans of Record; Plans and How to Refer to Them; The Use of Natural Boundaries in Descriptions; The Use of the Words "More or Less" in Descriptions; The Use of Astronomical Bearings in Descriptions; Description of Remainders; Description by Exception; Description of Railway Right of Way; Exception of Minerals in Descriptions; Interpretation of Faulty Descriptions; Forms of Preamble; Description of Examples.

CITY-PLANNING:

A Comprehensive Analysis of the Subject Arranged for the Classification of Books, Plans, Photographs, Notes and Other Collected Material, with Alphabetic Subject Index. By James Sturgis Pray and Theodora Kimball. Paper, 10 x 7½ in., 103 pp. Cambridge, Mass., Harvard University Press, 1913. 50 cents. (Donated by the Harvard University School of Landscape Architecture.)

The Classification contained in this work is stated to be the first comprehensive, systematic setting forth of the scope and varied character of this field. The newness of city planning (which includes the planning and organization of towns, suburbs, villages, and related rural districts) as an art, science, and profession, makes, it is said, an even development of the classification scheme impossible, but it is hoped that the systematic handling of the subject, as developed by the authors, may prove useful either for the classification of collected material, for the indication of relations between special parts of the whole field, or for a systematic analysis of the subject. It is intended for municipal officials, engineers, architects, students of city planning, librarians, etc., and should prove useful, it is stated, for classifying collections great or small, general or special. The Classification was originally developed for the material on city planning contained in the Library of the School of Landscape Architecture, at Harvard University, and is easily adaptable to other systems of classification. Its use is facilitated by an alphabetical subject index, and the authors, it is stated, have taken every means to make this index of the greatest possible service to all users of the Classification.

HANDBOOK ON SANITATION:

A Manual of Theoretical and Practical Sanitation. By George M. Price. Third Edition, Rewritten and Reset. Cloth, 7½ x 5½ in., illus., 11 + 353 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1913. \$1.50.

In a secondary title, it is stated that this handbook is intended for students and physicians, for health, sanitary, tenement-house, plumbing, factory, food, and other inspectors, as well as for candidates for all State and municipal sanitary positions, and the author hopes that the subject-matter may be of use to all who are interested in municipal sanitation and sanitary science. The first edition of this work, which is said to have been practically the first of its kind in the United States, was published in 1901, and this, the third, edition has been considerably revised and brought up to date, the chapter on "Ventilation" and the section on "Foods" having been entirely rewritten and considerably enlarged. Under the chapter on "Civil Service Examinations" are the questions given to candidates for various sanitary positions, by the New York State and Municipal Civil Service Commissions, a study of which it is hoped may prove beneficial to candidates and students in general. The Contents are: Part I, Sanitary Science: Soils and Sites; Air; Ventilation; Warming; Water; Water-Supply; Disposal of Sewage; Sewers; Plumbing; General Principles; Plumbing Pipes; Plumbing Fixtures; Defects in Plumbing Examination and Tests. Part II, Sanitary Practice: Section 1, Habitation; Section 2, Occupations and Trades; Section 3, Foods; Section 4, Disinfection and Disinfectants. Part III, Sanitary Inspection: Sanitation as a Profession; Qualifications For and Art of Inspection; Tenement-House Inspection; Civil-Service Examinations; Calculation of Areas and Cubic Space; Useful Memoranda and Tables; Index.

A READER OF SCIENTIFIC AND TECHNICAL SPANISH

For Colleges and Technological Schools, with Vocabulary and Notes. By Cornélis DeWitt Willcox. Cloth, 7½ x 5½ in., illus., 588 pp. New York, Sturgis & Walton Company, 1913. \$1.75.

The author states that this work has been prepared in the belief that it may be of use to students in colleges and technical schools who mean to practice engineering in Spanish-speaking Americas. The subject-matter consists of definitions and extracts from Spanish works relating to many branches of practical science, together with illustrations and a few notes, and, as presented, it is thought that it will give the reader not only a fair idea of the Spanish technical vocabulary, but, within the limits of the text, even a working knowledge of it. It is assumed, it is stated, that the student is already acquainted with ordinary Spanish, and the vocabulary, therefore, is limited to the scientific and technical words occurring in the text selected. The Contents are: Física; Química; La Conservación de las Pólvoras Modernas; Electricidad; Utilización del Agua Como Fuerza Motriz; Vapor; Aplicaciones del Aire Comprimido; Turbina; Transporte de la Fuerza a Distancia; Minería; Puentes; Ferrocarriles; Agrimensura; Topografía; Geografía; El Automóvil; Aeronáuticas; Submarinos; La Campaña de Santiago de Cuba; Vocabulario.

Gifts have also been received from the following:

- | | |
|---|--|
| Aberdeen, Scotland-Water Engr. 1 pam. | Hackney (London), England-Town Clerk. 1 bound vol., 2 pam. |
| Abrams, D. A. 1 pam. | Halifax, England-Town Clerk. 1 pam. |
| Allison, James F. 1 vol., 4 pam. | Hammersmith (London), England-Town Clerk. 1 bound vol. |
| Alvord & Burdick. 1 vol. | Harrogate, England-Town Clerk. 1 pam. |
| Am. Ceramic Soc. 1 vol. | Houston, Tex.-Water Commr. 2 pam. |
| Am. Inst. of Min. Engrs. 1 vol. | Illinois-State Geol. Survey. 1 vol. |
| Am. Water Works Assoc. 8 pam. | Iowa-Geol. Survey. 1 vol. |
| Arnold, Bion J. 1 bound vol. | Institution of Gas Engrs. 1 bound vol. |
| Ayr, Scotland-Town Clerk. 1 pam. | Inst. of Min. Engrs. 1 pam. |
| Baltimore, Md.-Harbor Board. 1 pam. | Iowa-Auditor of State. 1 bound vol. |
| Baltimore & Ohio R. R. Co. 1 pam. | Iowa-Geol. Survey. 1 bound vol. |
| Barrow-in-Furness, England-Town Clerk. 1 bound vol. | Iowa State Coll. of Agri. and Mechanic Arts. 1 pam. |
| Bethnal Green (London), England-Town Clerk. 1 bound vol. | Ipswich, England-Water Engr. 3 pam. |
| Birmingham, England-Water Dept. 2 pam. | Kalamazoo, Mich.-City Clerk. 1 bound vol. |
| Bolton, England-Borough Engr. and Surv. 8 bound vol. | Kansas City, Kans.-Finance Commr. 1 pam. |
| Bournemouth, England-Town Clerk. 2 pam. | Kingston-upon-Hull, England-Medical Officer of Health. 1 bound vol., 1 pam. |
| Bradford, England-Town Clerk. 1 vol. | Leeds, England-Water-Works Engr. 3 pam. |
| Brooklyn, N. Y.-Supt. of Bldgs. 4 pam. | Luton, England-Town Clerk. 2 pam. |
| Cedar Rapids, Iowa-City Clerk. 2 pam. | Madison, Wis.-City Clerk. 20 pam. |
| Chicago, Ill.-Bureau of Public Efficiency. 1 pam. | Madras, India-Public Works Dept. 1 bound vol. |
| Chicago, Ill.-Dept. of Public Works. 1 pam. | Maryland-State Board of Health. 1 vol. |
| Coatbridge, Scotland-Town Clerk. 1 pam. | Mass. Inst. of Tech. 1 vol. |
| Colorado Springs, Colo.-Water Dept. 1 pam. | Matschoss, Conrad. 1 pam. |
| Columbus, Ohio-Chf. Engr. of Dept. of Public Impvts. 1 vol. | National Board of Fire Underwriters. 13 pam. |
| Council Bluffs, Iowa-City Auditor. 2 pam. | National Fire Protection Assoc. 3 pam. |
| Darlington, England-Town Clerk. 2 pam. | New Bedford, Mass.-Clerk of Common Council. 1 bound vol. |
| Datesman, George E. 1 vol. | New Jersey-Geol. Survey. 2 pam. |
| Dooling, Peter J. 1 pam. | New London, Conn.-Water and Sewer Commrs. 1 pam. |
| Eastbourne, England-Town Clerk. 1 pam. | New York City-Bureau of Franchises. 1 pam. |
| Ferrocarriles Nacionales de Mexico. 1 pam. | New York City-Chf. Engr. of Board of Estimate and Apportionment. 1 pam. |
| Finsbury (London), England-Town Clerk. 1 vol. | New York State-Comm. to Investigate Port Conditions and Pier Extensions in New York Harbor. 1 pam. |
| Fitchburg, Mass.-Board of Water Commrs. 1 vol., 1 pam. | New York-State Conservation Comm. 1 bound vol. |
| Ford, Bacon & Davis. 2 bound vol. | New York City Record. 1 bound vol. |
| Fulham, England-Town Clerk. 1 bound vol. | Newcastle & Gateshead (England)-Water Co. 1 pam. |
| Germany-Kaiserliche Generaldirektion der Eisenbahnen in Elsass-Lothringen. 1 vol. | Newport, Ky.-Water-Works Dept. 1 pam. |
| Glasgow, Scotland-Town Clerk. 3 pam. | |

- North, Arthur T. 1 pam.
 Nottingham, England-Town Clerk. 2 bound vol.
 Nottingham, England-Water Dept. 3 pam.
 Ogden, Utah-City Auditor. 1 pam.
 Ontario Canada-Provincial Board of Health. 1 pam.
 Ontario, Canada-Registrar-Gen. 1 vol.
 Oregon, Univ. of. 1 vol.
 Paddington, England-Town Clerk. 1 bound vol.
 Pennsylvania-Topographic and Geol. Survey. 2 bound vol.
 Pennsylvania Lines West of Pittsburgh. 1 bound vol.
 Pere Marquette R. R. Co. 2 pam.
 Philippine Islands-Bureau of Customs. 1 pam.
 Philippine Islands-Bureau of Forestry. 1 pam.
 Philosophical Soc., Univ. of Virginia. 1 pam.
 Plymouth, England-Town Clerk. 3 pam.
 Plymouth, Mass.-Water Commrs. 5 pam.
 Poplar, England-Town Clerk. 1 pam.
 Porto Rico-Dept. of Sanitation. 1 vol.
 Portsmouth, England-Town Clerk. 1 bound vol.
 Puff, Charles F., Jr. 1 pam.
 Ramsgate, England-Town Clerk. 4 pam.
 Reading, England-Town Clerk. 1 pam.
 Rochdale, England-Town Clerk. 1 bound vol.
 St. Pancras (London), England-Town Clerk. 1 bound vol.
 Saskatchewan, Canada-Board of Highway Commrs. 1 pam.
 Saskatchewan, Canada-Dept. of Public Works. 1 pam.
 Shoreditch (London), England-Town Clerk. 1 bound vol.
 Southend-on-Sea, England-Borough Engr. 1 pam. 1 map.
 Spring Valley Water Co. 2 pam.
 Stanford, Charles W. 1 pam.
 Texas & Pacific Ry. Co. 1 pam.
 Todmorden, England-Town Clerk. 1 pam.
 Toronto, Ont.-Mayor. 2 pam.
 Tynemouth, England-Town Clerk. 1 bound vol.
 Tyrrell, Henry Grattan. 2 pam.
 Ulster & Delaware R. R. Co. 1 pam.
 Union Univ. 1 vol.
 U. S.-Bureau of Navigation. 2 pam.
 U. S.-Census Bureau. 1 bound vol. 1 pam.
 U. S.-Chf. of Engrs. 13 spec.
 U. S.-Chf. Signal Officer. 2 pam.
 U. S.-Coast and Geodetic Survey. 1 pam.
 U. S.-Dept. of Commerce. 1 vol.
 U. S.-Interstate Commerce Comm. 1 bound vol.
 U. S.-Isthmian Canal Comm. 1 bound vol. 1 pam. 62 maps.
 U. S.-Lake Survey Office. 1 map.
 U. S.-Library of Congress. 1 bound vol. 1 pam.
 U. S.-National Museum. 1 vol.
 U. S.-Navy Dept. 1 pam.
 U. S.-Office of Naval Intelligence. 2 pam.
 U. S.-Office of Public Roads. 1 pam.
 U. S.-Public Health Service. 1 bound vol.
 Victoria, Australia-Dept. of Mines. 1 vol.
 Wakefield, England-Water-Works Engr. 3 pam.
 Wallasey, England-Town Clerk. 1 pam.
 Wallsend, England-Town Clerk. 1 bound vol.
 West Virginia, Univ. of. 1 bound vol. 2 vol.
 Wimbledon, England-Town Clerk. 5 pam.
 Wisconsin-State Board of Health. 1 vol.
 Work, John D. 2 pam.

BY PURCHASE

Seehafenbau. Von F. W. Otto Schulze. Band 2, Ausbau der Seehäfen. Wilhelm Ernst & Sohn, Berlin, 1913.

Handbuch der Ingenieurwissenschaften: Dritter Teil, Der Wasserbau: Zweiter Band, Zweite Abteilung: Die Talsperren. Von E. Mattern, herausgegeben von Th. Rehbock. Vierte, vermehrte Auflage. Wilhelm Engelmann, Leipzig und Berlin, 1913.

Hydraulique. Par A. Flamant. Troisième Edition, Revue et augmentée. Librairie Polytechnique, Ch. Beranger, Editeur, Paris, 1909.

The Surveyor and Municipal and County Engineer, Vol. 17, 18, 20, 23, 24, and 30, for the Years 1900, 1901, 1903, and 1906. The St. Bride's Press, Ltd., London.

Logging: The Principles and General Methods of Operation in the United States. By Ralph Clement Bryant. John Wiley & Sons, New York; Chapman & Hall, Ltd., London, 1913.

Handbuch für Eisenbetonbau: Erster Band, Entwicklungsgeschichte und Theorie des Eisenbetons: Zweite Auflage, Die Grundzüge

der Geschichtlichen Entwicklung des Eisenbetons: Theorie und Versuche. Von M. Foerster and others. Wilhelm Ernst & Sohn, Berlin, 1912.

Quantitative Analysis by Electrolysis. By Alexander Classen, with the Coöperation of H. Cloeren. Translated from the Thoroughly Revised Fifth German Edition by William T. Hall. John Wiley & Sons, New York; Chapman & Hall, Ltd., London, 1913.

Beiträge zur Geschichte der Technik und Industrie: Jahrbuch des Vereines Deutscher Ingenieure, Von Conrad Matschoss. Vol. 1-3. Julius Springer, Berlin, 1909-11.

Metallurgical Analysis. By Nathaniel Wright Lord and Dana J. Demorest. Third Edition. McGraw-Hill Book Co., New York and London, 1913.

Mineral Deposits. By Waldemar Lindgren. McGraw-Hill Book Co., New York and London, 1913.

Refractories and Furnaces: Properties, Preparation, and Application of Materials Used in the Construction and Operation of Furnaces. By F. T. Havard. McGraw-Hill Book Co., New York and London, 1912.

Introduction to the Study of Igneous Rocks. By George Irving Finlay. McGraw-Hill Book Co., New York and London, 1913.

SUMMARY OF ACCESSIONS

(From December 2d, 1913, to January 5th, 1914)

Donations (including 13 duplicates)..... 255

By purchase..... 19

Total 274

MEMBERSHIP

ADDITIONS

(From December 5th, 1913, to January 8th, 1914.)

| MEMBERS | | Date of Membership. | |
|--|-----------|---------------------|----------|
| BECK, HENRY PHILLIPS. Member of Administrative Board, City Hall, Richmond, Va..... | | Dec. | 3, 1913 |
| BOWLER, FRANK COLBURN. Chf. Engr., Great } Northern Paper Co., Millinocket, Me. } M. | Assoc. M. | Oct. | 5, 1904 |
| | | Dec. | 31, 1913 |
| BUGBEE, ALVIN. Supt., Trenton Water-Works, 565 Ruther- ford Ave., Trenton, N. J..... | | Dec. | 3, 1913 |
| COLLINS, EMMETT FILMORE. Asst. Engr., St. L. & S. F. R. R., 613 Frisco Bldg., St. Louis, Mo..... | | Dec. | 3, 1913 |
| COREY, RAY HOWARD. Gen. Mgr., Coos Bay } Water Co., Marshfield, Ore. } M. | Assoc. M. | Oct. | 3, 1906 |
| | | Dec. | 3, 1913 |
| CREAGER, WILLIAM PITCHER. Asst. Hydr. Engr., J. G. White Eng. Corporation, 43 Exchange Pl., New York City. | | Oct. | 1, 1913 |
| DOYING, WILLIAM ALBERT EDWARD. Inspect- ing Engr., Isthmian Canal Comm. (Res., 3525 Fourteenth St., N. W.), Washing- ton, D. C..... | Assoc. M. | Feb. | 1, 1910 |
| | M. | Dec. | 3, 1913 |
| HANSEN, PAUL. Chf. Engr., Illinois State Water Survey, Univ. of Illinois, Ur- bana, Ill..... | Jun. | Jan. | 3, 1905 |
| | Assoc. M. | April | 1, 1908 |
| | M. | Dec. | 3, 1913 |
| HOBART, ALBERT CLAUDE. 51 Beach St., Westerly, R. I.... | | July | 2, 1913 |
| HORNE, HAROLD WELLINGTON. Div. Engr., Board of Water Commrs. of Hartford, } Farmington, Conn. } M. | Assoc. M. | Oct. | 2, 1907 |
| | | Dec. | 3, 1913 |
| JANNI, ALFREDO CARLO. Cons. Engr., 28 West 46th St., New York City..... | | Dec. | 3, 1913 |
| JENNINGS, JOHN EDWARD. Chf. Engr., Tower } Dept., Milliken Bros. Inc. (Res., 215 } Westminster Rd.), Brooklyn, N. Y.... } | Assoc. M. | Nov. | 30, 1909 |
| | M. | Dec. | 3, 1913 |
| KEEFE, DAVID ANDREW. Cons. and Inspecting Engr., 115 North St., Athens, Pa..... | | Dec. | 3, 1913 |
| LUND, SVERRE. Chf. Estimator and Designing Engr., East- ern Bridge & Structural Co., Worcester, Mass..... | | Dec. | 3, 1913 |
| MARTIN, CHARLES DEWEY. Hydr. and Irrig. Engr., 548 Twenty-first St., Merced, Cal..... | | Dec. | 3, 1913 |
| ROBERTSON, ALEXANDER KING. (The McAlpine Robertson Constr. Co.), 806 Metropolitan Bldg., Vancouver, B. C., Canada..... | | Dec. | 3, 1913 |
| SMITH, GEORGE EDSON PHILIP. Irrig. Engr., } Arizona Agri. Experiment Station, 1195 } Speedway, Tucson, Ariz. } M. | Jun. | Feb. | 3, 1903 |
| | Assoc. M. | Sept. | 6, 1905 |
| | | Dec. | 3, 1913 |
| SMOOT, LLOYD DUVAL. Chf. Engr. of Jacksonville, Engrs.' Bldg., Jacksonville, Fla..... | | July | 2, 1913 |

MEMBERS (Continued)

| | | Date of Membership. |
|---|-----------|------------------------|
| THOMSON, ALEXANDER, JR. Div. Engr., Board of Water Supply, Walden, N. Y..... | Jun. | Dec. 4, 1900 |
| | Assoc. M. | Feb. 3, 1904 |
| | M. | Dec. 3, 1913 |
| TROUT, HARRY EDGAR. The Scottwood, Robinwood and Monroe Sts., Toledo, Ohio..... | | Nov. 12, 1913 |
| VAN LIEW, JOHN EDGAR. Chf. Engr., Des Moines Plant, Des Moines Bridge & Iron Works, Des Moines, Iowa..... | Assoc. M. | July 1, 1908 |
| | M. | Nov. 12, 1913 |
| | | |
| VON PHUL, WILLIAM. Member of Firm, Ford, Bacon & Davis, 921 Canal St., New Orleans, La..... | | Dec. 3, 1913 |
| WICKERSHAM, JOHN HOUGH. Lancaster, Pa.. | Jun. | May 6, 1902 |
| | Assoc. M. | April 6, 1909 |
| | M. | Dec. 3, 1913 |

ASSOCIATE MEMBERS

| | | |
|--|-----------|---------------|
| ALLAN, THOMAS JOHN. Chf. Engr., The Realty Syndicate, Syndicate Bldg., Oakland, Cal..... | | Nov. 12, 1913 |
| ATWATER, HUNTINGTON CLARK. Asst. Engr., Alexander Potter, 191 Claremont Ave., New York City..... | | Dec. 31, 1913 |
| AYRES, LOUIS EVANS. Office Engr. for Gard- ner S. Williams, Cornwell Bldg., Ann Arbor, Mich..... | Jun. | Dec. 1, 1908 |
| | Assoc. M. | Dec. 3, 1913 |
| BEE, CHARLES EVERETT. Div. Engr., Southern Alberta Land Co., Champion, Alberta, Canada..... | | Dec. 3, 1913 |
| BELL, GEORGE EDWARD. Western Mgr., Dominion Bridge Co., Ltd., Winnipeg, Man., Canada..... | | Nov. 12, 1913 |
| BIGELOW, WILLIAM WALTER. Care, Sawyer & Moulton, 120 Exchange St., Portland, Me..... | Jun. | Feb. 1, 1910 |
| | Assoc. M. | Dec. 3, 1913 |
| BORDEN, GUY. 130 West 71st St., New York City..... | | Nov. 12, 1913 |
| BOYD, WALTER LACY. Engr. in Chg. of Constr., State Phos- phate Co., Bartow, Fla..... | | Dec. 31, 1913 |
| BRIGGS, EALY GRANNIS. Prin. Asst. Engr., Western Land Securities Co., Seney, Mich..... | | Nov. 12, 1913 |
| BROOKS, DAVID WALKER. Mgr., Specialty Dept., Concrete Steel Co., 32 Broadway (Res., 112 West 72d St.), New York City..... | Assoc. | Dec. 5, 1906 |
| | Assoc. M. | Dec. 31, 1913 |
| | | |
| BROOKS, JOSIAH RICHARDSON. Care, A. B. Brooks, 421 Peoples Gas Bldg., Chicago, Ill..... | Jun. | Feb. 2, 1909 |
| | Assoc. M. | Dec. 3, 1913 |
| BUNKER, GEORGE HITCHELL. James Sherman & Sons, Foot of 26th St., Brooklyn, N. Y..... | | July 2, 1913 |
| BURNELL, EUGENE. Care, Phoenix Constr. Co., Camp No. 3, Alexander, Idaho..... | | June 4, 1913 |

| ASSOCIATE MEMBERS (Continued) | | Date of Membership. |
|--|------------------|------------------------------|
| CHESLEY, FRANK EPHRAIM. Res. Engr., Sanitary Sewer System, Beaver Falls, Pa..... | | Dec. 31, 1913 |
| CHRISTIANSEN, EUGENE OLAF. Asst. Engr., U. S. Geological Survey, Wailuku, Maui, Hawaii..... | | Nov. 12, 1913 |
| COLE, EMMERT LUTHER. Structural Designer, Carnegie Steel Co., Baltimore, Md..... | | Dec. 31, 1913 |
| CUTLER, LEON GEORGE. With J. G. White & Co., 43 Exchange Pl., New York City..... | } Jun. 4 | April 5, 1910 |
| (Res., 125 South Parkway, East Orange, N. J.)..... | | Assoc. M. Dec. 31, 1913 |
| DEAN, DANIEL ABRAM. Supt. of Constr., James Stewart & Co., Care, New Winthrop Hotel, Winthrop Beach, Mass..... | | Dec. 31, 1913 |
| DU MOULIN, WALTER LOUIS. Supt., The Mor- enci Water Co., Morenci, Ariz..... | } Jun. Assoc. M. | Feb. 1, 1910 Dec. 3, 1913 |
| ENGLAND, ROLLO GUY. Civ. and Hydr. Engr., 117 Second St., Jackson, Mich..... | | Nov. 12, 1913 |
| FEIGEL, JOHN HENRY. Engr. for H. Osgood & Holland, 262 Orange St., Buffalo, N. Y. } | } Jun. Assoc. M. | Oct. 6, 1908 Oct. 1, 1913 |
| HALL, WARD. Asst. Engr., N. W. Pac. R. R., Irma, Cal.. | | Dec. 3, 1913 |
| HENDRICKS, SEWARD DANIEL. Engr. on Constr., Empire Eng. Corporation, 700 Telephone Bldg., Buffalo, N. Y. | | Dec. 31, 1913 |
| HUDMAN, ELLIS. Rock Springs, Wyo..... | | Nov. 12, 1913 |
| JENRICK, WILLIAM FREDERICK. Statistical Engr., The Foundation Co., 657 Bryant Ave., New York City..... | | Dec. 3, 1913 |
| KELSEY, LOUIS DE COU. City Engr., Aberdeen, Wash.... | | Nov. 12, 1913 |
| KITTS, JOSEPH ARTHUR. Corozal, Canal Zone, Panama.... | | Dec. 3, 1913 |
| MINER, ERWIN JOHN. Asst. Engr., Dept. of Public Service, Cincinnati, Ohio..... | | Dec. 3, 1913 |
| MORSE, HAROLD MARSTON. Designing and Const. Engr., H. Whitford Jones & Co., 2200 East 89th St., Cleveland, Ohio..... | | Dec. 3, 1913 |
| PAYROW, HARRY GORDON. Res. Engr., Lynn } Additional Water Supply, 150 Bellevue Rd., Lynn, Mass..... | } Jun. Assoc. M. | Feb. 4, 1908 Dec. 3, 1913 |
| REA, RICHARD WILLIS. Engr., Cascade Irrig. Dist., P. O. Box 416, Ellensburg, Wash..... | | Dec. 3, 1913 |
| ROOT, JOSEPH EUGENE. Office Engr., Dept. of Public Works, 3436 Lyleburn Pl., Cincinnati, Ohio..... | | Dec. 3, 1913 |
| RUSSELL, CLAUD. Acting Div. Engr., Bureau of Public Works, Philippine Islands, Cebu, Cebu, Philippine Islands..... | | July 2, 1913 |
| SARGENT, EDWARD HAYNES. Asst. Civ. Engr., New York State Conservation Comm., 25 Delaware Terrace, Albany, N. Y..... | | Dec. 31, 1913 |

| ASSOCIATE MEMBERS (Continued) | | Date of Membership. |
|---|--|------------------------|
| SKINNER, BENJAMIN BAKER. 97 Kenmore Pl., Brooklyn, N. Y. | | Nov. 12, 1913 |
| SMITH, CHESTER KITCH. Bridge Engr., Spokane, Portland & Seattle Ry., Care, Chf. Engr.'s Office, Portland, Ore. | | Dec. 3, 1913 |
| SNYDER, HUBERT EARL. Engr. of Constr., } Logan Min. Co., Logan, W. Va. { | Jun. May 2, 1911 Assoc. M. Dec. 31, 1913 | |
| STAFFORD, EDWARD SATTLEY. Care, Casa Grand Val. Water Users' Assoc., Florence, Ariz. | | Nov. 12, 1913 |
| STEES, JAMES GORDON. Capt., Corps of } Engrs., U. S. A., West Point, N. Y. { | Jun. Aug. 31, 1909 Assoc. M. Dec. 3, 1913 | |
| WABNER, JAMES MADISON. Chf. Engr., Onon- daga Litholite Co., 301 Slocum Ave., } Syracuse, N. Y. { | Jun. April 6, 1909 Assoc. M. Dec. 3, 1913 | |
| WEST, WADE CLARENCE. Care, Bureau of Public Works, Manila, Philippine Islands. | | Sept. 3, 1913 |
| WILKINS, HOMER JENNER. Drainage Engr., 1819 } West 9th St., Oklahoma, Okla. { | Jun. Oct. 31, 1911 Assoc. M. Dec. 3, 1913 | |

ASSOCIATES

| | |
|--|--------------|
| WILSON, HUGH MONROE. Vice-Pres. and Gen. Mgr., McGraw Pub. Co., Inc., 239 West 39th St. (Res., 375 Park Ave.), New York City | Dec. 3, 1913 |
|--|--------------|

JUNIORS

| | |
|--|---------------|
| ALLEN, FRANKLIN REA. City Engr., Pine Bluff, Ark. | Dec. 3, 1913 |
| ANGAS, ROBERT MOORE. Engr. in Chg., Development Work, Indian River Assoc., Hobe Sound, Fla. | Dec. 3, 1913 |
| BAKER, DONALD MCCORD. Asst. Engr., U. S. Indian Irrig. Service, Box 445, Albuquerque, N. Mex. | Dec. 3, 1913 |
| BARBER, NORMAN NATHANIEL. Asst. Engr., C., M. & St. P. Ry., Care, C., M. & St. P. Junction, Ottumwa, Iowa (Res., 6202 Ingleside Ave., Chicago, Ill.) | Dec. 3, 1913 |
| BECK, RALPH ERNEST. 35 Conklin Ave., Newark, N. J. | Dec. 3, 1913 |
| BITHER, TOM ALLEN. With City Engr., 1630 Josephine St., Berkeley, Cal. | Oct. 1, 1913 |
| BLEY, CHARLES NICHOLAS. 2107 Hearst Ave., Berkeley, Cal. | Nov. 12, 1913 |
| BRINGHURST, HORACE MORTON. Engr. Draftsman, Bldg. Dept., City of Seattle, 552 Eighteenth Ave., Seattle, Wash. | Nov. 12, 1913 |
| BRINKERHOFF, GEORGE LOCKWOOD. Care, Isthmian Canal Comm., Gatun, Canal Zone, Panama. | Oct. 1, 1913 |
| CLAUSEN, STANLEY JAMES. With Mississippi River Comm., 1311 Liggett Bldg., St. Louis, Mo. | July 2, 1913 |
| CRANE, JACOB LESLIE, JR. 823 Searritt Bldg., Kansas City, Mo. | Dec. 3, 1913 |

| JUNIORS (Continued) | | Date of Membership. |
|--|--|---------------------|
| DURYEA, ROBERT FRANCIS. 1280 California St., San Francisco, Cal..... | | Oct. 1, 1913 |
| FLOOK, LYMAN RUSSELL. Asst. to Supt. of Bldgs. and Grounds Dept., Univ. of Michigan, 616 Church St., Ann Arbor, Mich..... | | Dec. 3, 1913 |
| FRANK, LESLIE CARL. 1317 Madison Ave., Baltimore, Md..... | | Dec. 3, 1913 |
| GOWEN, JOHN FELLOWS. Asst. Engr., Board of Water Supply, City of New York, Ossining, N. Y..... | | Oct. 1, 1913 |
| HABERLE, EDWARD LOUIS. 2425 Lyndale Ave., North, Minneapolis, Minn..... | | Dec. 3, 1913 |
| HENNING, CHARLES SUMNER, JR. P. O. Box 298, Vale, Ore..... | | Dec. 3, 1913 |
| HINDE, CHARLES. City Engr.'s Office, Vancouver, B. C., Canada..... | | Nov. 12, 1913 |
| HUXTABLE, WILLIAM GUIREY. With W. E. Ayres, Cons. Engr., Earle, Ark..... | | Nov. 12, 1913 |
| KAMINSKY, BENNETT. Chf. Draftsman, Office Engr., M. of W., The Indianapolis Union Ry., Room 4, Union Station, Indianapolis, Ind..... | | July 2, 1913 |
| KIRCHGRABER, HAMLIN EARLE. 801 West End Ave., New York City..... | | Dec. 3, 1913 |
| MCGEE, HAROLD GILBERT. 303 Hartman Bldg., Columbus, Ohio..... | | Dec. 3, 1913 |
| MILLER, JOHN OWEN. 1595 Clay St., San Francisco, Cal... | | July 2, 1913 |
| OCKERT, FREDERICK WILLIAM. 254 West 104th St., New York City..... | | Dec. 31, 1913 |
| OSGOOD, MANLEY. City Engr., Ann Arbor, Mich..... | | Dec. 31, 1913 |
| ROBSON, RALPH EWART. Templeton, Cal..... | | Oct. 3, 1911 |
| SEGURA, VALERIANO. Asst. Engr., Bureau of Public Works, Cebu, Cebu, Philippine Islands..... | | Oct. 1, 1913 |
| STEVENS, HAROLD CROSBY. Prin. Asst. Engr., Blair & Drave, 1205 Commercial Bldg., Charlotte, N. C..... | | Dec. 31, 1913 |
| WALKER, GUY BURT. City Engr.'s Office, City Hall, Wilkes-Barre, Pa..... | | Dec. 3, 1913 |
| WENDELBOE, LEE. Care, U. S. Reclamation Service, Logan, Utah..... | | Dec. 3, 1913 |
| WOODRUFF, GLENN BARTON. Bridge Designer with L. V. R. R., 438 Cherokee St., South Bethlehem, Pa..... | | Dec. 3, 1913 |

RESIGNATIONS

MEMBERS

| | Date of Resignation. |
|-----------------------------|----------------------|
| BROWN, ROBERT CALVIN..... | Dec. 31, 1913 |
| FENN, ROBERT WILLSON..... | Dec. 31, 1913 |
| GREENE, FRANCIS VINTON..... | Dec. 31, 1913 |

MEMBERS (*Continued*)

| | Date of Resignation. |
|-----------------------------------|-------------------------|
| HAYT, STEPHEN THURSTON, JR..... | Dec. 31, 1913 |
| JACKSON, THOMAS HERBERT..... | Dec. 31, 1913 |
| KAUFFMANN, WILLIAM FREDERICK..... | Dec. 31, 1913 |
| KENRICK, ROBERT BOTELER..... | Dec. 31, 1913 |
| MARTIN, KINGSLEY LEVERICH..... | Dec. 31, 1913 |
| VON EMPERGER, FRITZ EDLER..... | Dec. 31, 1913 |

ASSOCIATE MEMBERS

| | |
|-------------------------------|---------------|
| ALEXANDER, JOHN HOWARD..... | Dec. 31, 1913 |
| CROSS, JOHN HALSEY..... | Dec. 31, 1913 |
| FORREST, GEORGE MUNRO..... | Dec. 3, 1913 |
| KREINER, HARRY PETER..... | Dec. 31, 1913 |
| MCCOY, CHARLES EPHRAIM..... | Dec. 31, 1913 |
| MEYERS, CLARENCE WILLIAM..... | Dec. 31, 1913 |
| MORRISON, CHARLES EDWARD..... | Dec. 31, 1913 |
| SHORTT, JOHN HAGGERTY..... | Dec. 31, 1913 |

ASSOCIATES

| | |
|-----------------------------------|---------------|
| DRUMMOND, THOMAS JOSEPH..... | Dec. 31, 1913 |
| MCBURNAY, HENRY..... | Dec. 31, 1913 |
| MEYER, HENRY CODDINGTON, JR..... | Dec. 31, 1913 |
| SCRIBNER, GILBERT HILTON, JR..... | Dec. 31, 1913 |

JUNIORS

| | |
|-----------------------------------|---------------|
| CALDER, JOHN WEBSTER..... | Dec. 31, 1913 |
| GUNDLACH, GEORGE CHRISTIAN..... | Dec. 31, 1913 |
| HINRICHS, ADOLF..... | Dec. 31, 1913 |
| HOLLOWAY, ARTHUR POWER..... | Dec. 31, 1913 |
| KINCAID, MURTLAND..... | Dec. 31, 1913 |
| LEETE, ROBERT BURT..... | Dec. 31, 1913 |
| MACLEISH, GORDON GRANT..... | Dec. 31, 1913 |
| NAGEL, THEODORE..... | Dec. 31, 1913 |
| ROBINSON, WARD REID..... | Dec. 31, 1913 |
| WHITMAN, WILLIAM SATTERWHITE..... | Dec. 31, 1913 |

DEATHS

- CLARKSON, ROBERT COOKE. Elected Junior, January 5th, 1887; Member, January 2d, 1901; died December 26th, 1913.
- CLAYTON, HENRY HELM. Elected Junior, December 3d, 1907; died in April, 1913.
- COMPTON, ALFRED G. Elected Associate, September 5th, 1877; died December 13th, 1913.
- COTTON, JOSEPH P. Elected Member, June 7th, 1876; died December 27th, 1913.
- FORBES, MURRAY. Elected Associate Member, June 5th, 1907; died December 28th, 1913.

- GRAY, HARRY Woy. Elected Associate Member, November 1st, 1910; died December 14th, 1913.
- LABELLE, HENRY FRANCIS. Elected Member, April 6th, 1898; died December 12th, 1913.
- LUTZ, ULYSSES STANISLAUS. Elected Member, March 5th, 1912; died December 8th, 1913.
- MACCRACKEN, GEORGE GERE. Elected Junior, February 5th, 1901; Associate Member, February 3d, 1904; died August 1st, 1913.
- MILES, JOHN WILEY. Elected Associate Member, October 2d, 1901; Member, April 6th, 1909; died in January, 1912.
- RICHMOND, HENRY A. Elected Fellow, July 7th, 1870; died May 10th, 1913.
- VLEGENTHART, JOHANNES CORNELIS. Elected Associate Member, June 5th, 1907; died in October, 1913.
- WOOD, HENRY SHOTWELL. Elected Member, May 1st, 1907; died December 5th, 1913.

Total Membership of the Society, January 8th, 1914,

7 284.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(December 2d, 1913, to January 5th, 1914)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- (1) *Journal*, Assoc. Eng. Soc., Boston, Mass., 30c.
- (2) *Proceedings*, Engrs. Club of Phila., Philadelphia, Pa.
- (3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
- (4) *Journal*, Western Soc. of Engrs., Chicago, Ill., 50c.
- (5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Gesundheits Ingenieur*, München, Germany.
- (8) *Stevens Institute Indicator*, Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *Engineering Record*, New York City, 10c.
- (15) *Railway Age Gazette*, New York City, 15c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Electric Railway Journal*, New York City, 10c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 15c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 20c.
- (21) *Railway Engineer*, London, England, 1s. 2d.
- (22) *Iron and Coal Trades Review*, London, England, 6d.
- (23) *Railway Gazette*, London, England, 6d.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *Railway Age Gazette*, Mechanical Edition, New York City, 20c.
- (26) *Electrical Review*, London, England, 4d.
- (27) *Electrical World*, New York City, 10c.
- (28) *Journal*, New England Water-Works Assoc., Boston, Mass., \$1.
- (29) *Journal*, Royal Society of Arts, London, England, 6d.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
- (31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand*, Brussels, Belgium, 4 fr.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France, 1 fr.
- (34) *Portefeuille Economiques des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *Cornell Civil Engineer*, Ithaca, N. Y.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
- (40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pfg.
- (41) *Electrotechnische Zeitschrift*, Berlin, Germany.
- (42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, \$1.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
- (45) *Colliery Engineer*, Scranton, Pa., 25c.
- (46) *Scientific American*, New York City, 15c.
- (47) *Mechanical Engineer*, Manchester, England, 3d.
- (48) *Zeitschrift, Verein Deutscher Ingenieure*, Berlin, Germany, 1, 60m.
- (49) *Zeitschrift für Bauwesen*, Berlin, Germany.
- (50) *Stahl und Eisen*, Düsseldorf, Germany.
- (51) *Deutsche Bauzeitung*, Berlin, Germany.
- (52) *Rigasche Industrie-Zeitung*, Riga, Russia, 25 kop.
- (53) *Zeitschrift, Oesterreichischer Ingenieur und Architekten Veretnes*, Vienna, Austria, 70h.

- (54) *Transactions*, Am. Soc. C. E., New York City, \$12.
 (55) *Transactions*, Am. Soc. M. E., New York City, \$10.
 (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$6.
 (57) *Colliery Guardian*, London, England, 5d.
 (58) *Proceedings*, Engrs. Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
 (59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
 (62) *Industrial World*, 59 Ninth St., Pittsburgh, Pa., 10c.
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.
 (64) *Power*, New York City, 5c.
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
 (66) *Journal of Gas Lighting*, London, England, 6d.
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.
 (68) *Mining Journal*, London, England, 6d.
 (69) *Der Eisenbau*, Leipzig, Germany.
 (71) *Journal*, Iron and Steel Inst., London, England.
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
 (72) *American Machinist*, New York City, 15c.
 (73) *Electrician*, London, England, 18c.
 (74) *Transactions*, Inst. of Min. and Metal., London, England.
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.
 (76) *Brick*, Chicago, Ill., 10c.
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
 (79) *Forschungsarbeiten*, Vienna, Austria.
 (80) *Tonindustrie Zeitung*, Berlin, Germany.
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
 (82) *Mining and Engineering World*, Chicago, Ill., 10c.
 (83) *Gas Age*, New York City, 15c.
 (84) *Le Ciment*, Paris, France.
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.
 (87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.
 (90) *Transactions*, Inst. of Naval Archts., London, England.
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
 (94) *The Boiler Maker*, New York City, 10c.
 (95) *International Marine Engineering*, New York City, 20c.
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
 (101) *Metal Worker*, New York City, 10c.
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
 (103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.
 (106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
 (108) *Southern Machinery*, Atlanta, Ga., 10c.

LIST OF ARTICLES

Bridges.

- Trusses without Diagonals in Reinforced Concrete.* V. J. Elmont. (5) Vol. 27, Pt. 1.
 The Erection of the Municipal Bridge, St. Louis, Mo. W. H. Radcliffe. (4) Nov.
 Vertical Lift Drawbridges.* (12) Serial beginning Nov. 28.
 Proportioning of Long-Span Truss and Cantilever Bridges. Joseph Mayer. (3) Dec.
 American River Bridge.* A. M. Wolf. (87) Dec.
 Influence of the Position of Crown Hinge on the Weight and Deflection of a Three-Hinged Spandrel-Braced Arch.* M. A. Beltaire, Jr., and R. W. Parkhurst. (36) Dec.
 Hard Roads and Permanent Bridges.* Daniel B. Luten. (67) Dec.
 Lifting the One Hundred and Thirty Million Pound Quebec Bridge.* H. F. Stratton. (9) Dec.

*Illustrated.

Bridges—(Continued).

- Transferring Bridge Spans on Barges. (13) Dec. 4.
 Erecting the St. Lawrence River Bridge.* (23) Dec. 5.
 Unusual Abutment Design, Hollow Reinforced-Concrete Triangular Boxes at Three-Level Crossing of Creek, Railroad Avenue at Montclair.* (14) Dec. 6.
 Viaduct Floor of Hollow Concrete Tile.* (14) Dec. 6.
 Observations on Bridge Expansion.* H. A. Loser. (13) Dec. 11.
 The Sydney Harbour Bridge.* (11) Dec. 12.
 Safeguarding Displaced Viaduct Piers.* (14) Dec. 13.
 Moving Loads on Steel Bridges. (14) Dec. 13.
 Bridge Construction at Newcastle, N. B.* C. A. Wentworth. (96) Dec. 18.
 Pont Notre-Dame Reconstruction, Paris; Arch Replacement under Traffic.* (13) Dec. 18.
 Schuylkill River Bridge Improvements.* (15) Dec. 19.
 The Lower Ganges Bridge.* (23) Dec. 19.
 Largest Bascule Bridge, Double-Track, Single-Leaf Span for Baltimore & Ohio Bridge over Calumet River, Chicago, has Length of 230 Feet.* (14) Dec. 20.
 Deep-Water Piers for Passaic and Hackensack River Bridges, Building Pile Foundations and Depositing Concrete on Them Under Water in Cofferdams and in Submerged Forms.* (14) Dec. 20.
 Bridges, Stations and Masonry Work on the Montclair Branch Improvements, Delaware, Lackawanna and Western.* (14) Dec. 20.
 Substructure Work for Canadian Pacific Railway Bridge at Mud Lake, Ont.* (86) Dec. 24.
 Cost of Dismantling an Old Highway Bridge and Erecting New Truss and Girder Spans. George Harper. (86) Dec. 24.
 Two Large Concrete Arches on a Swiss Mountain Railway.* (13) Dec. 25.
 High Cantilever Bridge in Mexico.* (15) Dec. 26.
 Preliminary Considerations in the Design of Opening Bridges. Henry Grattan Tyrrell. (15) Dec. 26.
 Dreigelenkbogen aus Beton mit grosser Spannweite und kleiner Konstruktionshöhe. D. Kutschke. (51) Serial beginning Sup. No. 23.
 Der Neubau der Arndt-Strassen-Ueberschneidung in Königsberg i. Pr.* Ernst Schönwald. (51) Sup. No. 23.
 Die Erschütterungen bei den Sprengungen der Strompfeller der alten Kölner Eisenbahnbrücke.* Christfreund. (40) Nov. 8.
 Das Segmentschütz der Freilarche in Spandau.* Klehmet. (40) Nov. 26.
 Die Dritte Phase der gebogenen Eisenbetonträger.* Max R. v. Thullie. (53) Nov. 28.
 Breitflanschige Träger. Schaper. (40) Nov. 29.
 Hängebrücke über die Luzège in der Kleinbahn von Ussel nach Tulle. Landsberg. (40) Dec. 10.
 Eisenbetoncaisson der Elbebrücke in Obristvi (Böhmen).* Lumfr Kapsa. (78) Dec. 15.
 Strassenbrücke mit aufgehängter Fahrbahn.* C. Ritter. (78) Dec. 15.
 Kontinuierliche Bogenträger auf elastischen Stützen.* A. Ostenfeld. (78) Dec. 15.

Electrical.

- Report of Committee on Street Lighting, American Society of Municipal Improvements.* (99) 1912.
 Phase Compensation.* G. H. Eardley-Wilmot. (73) Nov. 28.
 A 25 000-kw. Parsons Turbo-Alternator.* (26) Nov. 28.
 Operation of Transmission Lines.* Lee Hagood. (42) Dec.
 The Dielectric Strength of Thin Insulating Materials. F. M. Farmer. (42) Dec.
 High-Voltage Engineering.* F. W. Peek, Jr. (3) Dec.
 Street Lighting with Tungsten Lamps.* (60) Dec.
 Pressure Rises.* William Duddell. (77) Dec. 1.
 The British Standard Specification for Consumers' Electric Supply Meters. S. H. Holden. (77) Dec. 1.
 A Two-Rate Tariff System Without Time-Operated Control.* H. H. Perry. (77) Dec. 1.
 Breaking Capacities of Oil-Switches.* S. Ferguson. (73) Dec. 5.
 High-Speed Turbines at Marylebone.* (26) Dec. 5; (73) Dec. 5.
 Wireless for Railroad Trains.* (46) Dec. 6.
 Transmission Line Work.* Ernest V. Pannell. (96) Dec. 11.
 The Applications of Electricity to Agriculture.* T. Thorne Baker. (29) Dec. 12.
 A Simple Torquemeter.* H. H. Broughton. (73) Dec. 12.
 Dubiller's Wireless Telegraph and Telephone Apparatus.* (73) Serial beginning Dec. 12.
 The Radio-Telegraph Installation on Board the *Imperator*.* (73) Dec. 12.
 Small Electric Light and Power Undertakings.* H. P. Girling. (26) Dec. 12.

*Illustrated.

1. The first part of the report deals with the general principles of the theory of the atom. It begins with a discussion of the classical theory of the atom, which was developed by Rutherford and Bohr. This theory was based on the assumption that the electron orbits the nucleus in a circular path. However, it was found that this theory could not explain the stability of the atom, as the electron would lose energy and spiral into the nucleus. This led to the development of the quantum theory of the atom, which was proposed by Schrodinger and Heisenberg. This theory is based on the assumption that the electron is described by a wave function, which satisfies the Schrodinger equation. The wave function is a mathematical function that describes the probability of finding the electron at a particular position. The square of the magnitude of the wave function gives the probability density. The wave function is also subject to the uncertainty principle, which states that the position and momentum of a particle cannot be known simultaneously with arbitrary precision. The quantum theory of the atom has been very successful in explaining the observed spectra of atoms and the stability of the atom. It has also led to the development of quantum mechanics, which is the foundation of modern physics.

2. The second part of the report deals with the experimental results of the study. It begins with a discussion of the experimental setup, which consists of a vacuum chamber containing a gas of atoms. The atoms are excited by a laser beam, and the emitted light is detected by a photomultiplier. The results of the experiment are shown in the form of a graph of the intensity of the emitted light versus the wavelength. The graph shows a series of sharp peaks, which correspond to the discrete energy levels of the atom. These results are in good agreement with the predictions of the quantum theory of the atom. The experiment also shows that the intensity of the emitted light is proportional to the square of the magnitude of the wave function, which is in agreement with the quantum theory of the atom.

3. The third part of the report deals with the theoretical results of the study. It begins with a discussion of the theoretical model of the atom, which is based on the quantum theory of the atom. The model assumes that the electron is described by a wave function, which satisfies the Schrodinger equation. The wave function is also subject to the uncertainty principle. The theoretical results of the study are shown in the form of a graph of the intensity of the emitted light versus the wavelength. The graph shows a series of sharp peaks, which correspond to the discrete energy levels of the atom. These results are in good agreement with the experimental results. The theoretical model also predicts that the intensity of the emitted light is proportional to the square of the magnitude of the wave function, which is in agreement with the experimental results.

4. The fourth part of the report deals with the conclusions of the study. It begins with a discussion of the main results of the study, which are the experimental results and the theoretical results. The experimental results show that the intensity of the emitted light is proportional to the square of the magnitude of the wave function, which is in agreement with the quantum theory of the atom. The theoretical results also show that the intensity of the emitted light is proportional to the square of the magnitude of the wave function, which is in agreement with the experimental results. The study also shows that the quantum theory of the atom is able to explain the observed spectra of atoms and the stability of the atom. The study also shows that the quantum theory of the atom is the foundation of modern physics.

5. The fifth part of the report deals with the references. It lists the following references:

- Rutherford, E. (1911) "The Scattering of α Particles by Matter," *Philosophical Magazine*, **21**, 103-123.
- Bohr, N. (1913) "On the Constitution of Matter with Special Reference to the Hydrogen Atom," *Philosophical Magazine*, **26**, 1-40.
- Schrodinger, E. (1926) "Quantisierung als Eigenwertproblem," *Anzeiger der Akademie der Wissenschaften in Wien*, **1**, 1-10.
- Heisenberg, W. (1927) "Ueber den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Zeitschrift fur Physik*, **41**, 1-26.
- Dirac, P. A. M. (1928) "The Quantum Theory of the Electron," *Proceedings of the Royal Society (London)*, **114**, 243-249.
- Schrodinger, E. (1927) "Der stetige Fall der Schrodinger'schen Theorie," *Zeitschrift fur Physik*, **39**, 1-51.
- Heisenberg, W. (1925) "Ueber den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Zeitschrift fur Physik*, **41**, 1-26.
- Dirac, P. A. M. (1928) "The Quantum Theory of the Electron," *Proceedings of the Royal Society (London)*, **114**, 243-249.
- Schrodinger, E. (1927) "Der stetige Fall der Schrodinger'schen Theorie," *Zeitschrift fur Physik*, **39**, 1-51.
- Heisenberg, W. (1925) "Ueber den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Zeitschrift fur Physik*, **41**, 1-26.
- Dirac, P. A. M. (1928) "The Quantum Theory of the Electron," *Proceedings of the Royal Society (London)*, **114**, 243-249.

Electrical—(Continued).

- Aeroplane for Patrolling Electric Transmission Lines, Western Power Company Employs Aviator to Make Regular Trips of Inspection and Repair. (14) Dec. 13.
- The Characteristics of Insulation Resistance.* S. Evershed. (77) Dec. 15.
- The Magnetization of Iron at Low Inductions. Lancelot W. Wild. (77) Dec. 15.
- The General Advantage of the Electric Furnace in the Foundry. Ernest P. Humbert. (Paper read before the Pittsburgh Foundrymen's Assoc.) (62) Dec. 15.
- Dynamos for Motor Road-Vehicle Lighting.* J. D. Morgan. (77) Dec. 15.
- Methods of Telephone Appraisal in Nebraska. E. C. Hurd. (86) Dec. 17.
- 100-Ton Electric Overhead Travelling Crane.* (12) Dec. 19.
- The Rennerfelt Electric Furnace.* Axel Sahlin. (22) Dec. 19.
- The Electrical Design of Induction Motors.* H. L. Smith. (Paper read before the Rugby Eng. Soc.) (47) Serial beginning Dec. 19.
- Single-Phase Power Factor Indicators for Variable Frequency.* Leonard Murphy. (73) Dec. 19.
- The Electric Supply System of Stockholm.* (11) Serial beginning Dec. 19.
- Telephone Engineering Economics. H. Smith. (Abstract of paper read before the Inst. of Post Office Elec. Engrs.) (73) Dec. 26.
- Outdoor Air-Break Switchgear.* W. A. Coates. (26) Dec. 26.
- The Great World Wireless Circuit.* J. F. Springer. (46) Dec. 27.
- Handling, Sampling and Testing of Transformer Oil.* George E. Armstrong. (27) Dec. 27.
- Induction Regulators.* John A. Randolph. (64) Dec. 30.
- Notes on Open Up Ozonator Designs.* A. Vosmaer. (105) Jan.
- Sources of Direct Current for Electrochemical Processes. F. D. Newbury. (42) Jan.
- Instability of Electric Circuits.* Charles P. Steinmetz. (42) Jan.
- Methods of Mitigating Electrolysis from Street Railway Currents. E. B. Rosa and Burton McCullom. (17) Jan. 3.
- Rate-Making for Central Stations. William H. Winslow. (27) Jan. 3.
- The Commonwealth Edison Testing Laboratories.* (27) Jan. 3.
- La Nouvelle Station Centrale d'Electricité de la Compagnie du Gaz de Lyon.* (33) Nov. 22.
- Das staatliche Kraftwerk am Trollbåttan.* (41) Nov. 27.
- Neues Verfahren zur Verstärkung elektrischer Ströme.* Eugene Reisz. (41) Nov. 27.
- Die Gottsche Kabelschaltung.* Heinrich Dreisbach. (41) Dec. 4.
- Die Elektrizität im Automobil.* F. W. Mook. (41) Serial beginning Dec. 4.
- Verbesserung des Leistungsfaktors in öffentlichen Elektrizitätswerken.* R. Nagel. (41) Dec. 4.
- Betriebsmessungen in einer Einphasenstrom-Gleichrichteranlage.* J. Epstein. (41) Dec. 11.
- Zur Frage der Ueberspannungsschutzapparate.* George Giles. (41) Dec. 11.
- Vermeintliche und wirkliche Ueberspannungswirkungen in Hochspannungsanlagen. Felix Finckh. (41) Dec. 18.
- Ueber die graphische Darstellung farbiger Lichtquellen.* Erich Jasse. (41) Dec. 18.
- Die Elektrizität auf den Bauplätzen der Grossstädte. Rudolf von Erhardt. (41) Dec. 20.

Marine.

- Five-Masted Auxiliary Sailing Ship *France*.* F. C. Coleman. (95) Dec.
- Electrically-Driven Cargo Boat *Tynemount*.* C. Van Langendonck. (95) Dec.
- Inland Navigation Barges with Producer-Gas Engines.* (13) Dec. 4.
- The Channel Steamer *Paris* and Geared Turbines.* (11) Dec. 5.
- The Present Position of the Diesel Engine, Chiefly in Marine Propulsion. George Carels. (Abstract of paper read before the Northeast Coast Institution of Engrs. and Shipbuilders.) (47) Serial beginning Dec. 12; (12) Dec. 5.
- Twin-Screw Harbour Tug and Passenger Tender.* (12) Dec. 12.
- Hamburg-American Co.'s T. S. S. *Königin Luise* with Föttinger Transformer.* (11) Dec. 12.
- The Radio-Telegraph Installation on Board the *Imperator*.* (73) Dec. 12.
- Recent Developments in Marine Propulsion. W. H. Watkinson. (Abstract of paper read before the Liverpool Univ.) (47) Dec. 12.
- A New Dry Dock on the St. Lawrence River at Levis, Quebec.* (13) Dec. 18.
- Diesel Marine Oil-Engines.* (11) Dec. 19.
- Shipbuilding at St. Nazaire and the French Battleship *Lorraine*.* (12) Dec. 26.
- The Allan Liner *Alsatian*.* (11) Dec. 26.
- The Latest United States Battleship.* (95) Jan.
- Die neuen Motorschiffe des Kreises Telton.* G. Landsberg. (48) Nov. 8.

*Illustrated.

Mechanical.

- The Electrification of a Reversing Mill at the Algoma Steel Co.* Bradley T. McCormick. (5) Vol. 27, Pt. 1.
- A Graphic Solution of D'Arcy's Formula for the Transmission of Compressed Air in Pipes.* Nathaniel Herz. (56) Vol. 44.
- Heat-Losses in Furnaces. F. A. J. Fitzgerald. (56) Vol. 44.
- The Manufacture of Coke.* William Hutton Blauvelt. (56) Vol. 44.
- Fuel-Efficiency of the Cupola-Furnace.* John Jermain Porter. (56) Vol. 44.
- Melting Iron in the Cupola Furnace. R. Moldenke. (56) Vol. 44.
- The Use of Pulverized Coal in Metallurgical Furnaces.* James Loud. (58) Oct.
- A New Three-High Universal Mill.* W. P. Starkey. (98) Oct.
- Coal-Unloading Plant, Fort William, Canadian Pacific Railway.* (23) Oct. 10.
- The Adaptation of Boiler Furnaces to Available Coals.* Henry Kreisinger and Walter T. Ray. (4) Nov.
- Some Economies on a Gas-Works.* Harold W. Woodall. (Paper read before the Southern District Assoc. of Gas Engrs. and Managers.) (66) Nov. 25.
- Extraction of Tar from Water Gas. R. P. Harris. (Paper read before the Southern District Assoc. of Gas Engrs. and Managers.) (66) Nov. 25.
- Behaviour of Water in Gasholder Cups and Tanks. Herbert W. Alrich. (Paper read before the Am. Gas Inst.) (66) Nov. 25.
- The Purification of Coal Gas. Henry Doran. (Paper read before the Scottish Junior Gas Assoc.) (66) Nov. 25.
- Crossley's Open-Hearth Suction Gas Plant. A. Vennell Coster. (Paper read before the Leigh Eng. Soc.) (47) Nov. 28.
- Possibilities of Reducing the Smoke Production in Salt Lake City. O. W. Ott. (Paper read before the Utah Soc. of Engrs.) (1) Dec.
- Modifications to the Massachusetts Boiler Rules of 1913 Suggested by the American Boiler Manufacturers' Association. (94) Dec.
- Gravel Washing and Crushing Plant.* (67) Dec.
- The Manufacture of Hydrated Lime.* (67) Dec.
- Carbonization in Bulk for Gas Production.* G. Stanley Cooper. (66) Dec. 2.
- The Properties, Coating and Laying of Steel and Wrought Iron Pipe. H. L. Rice. (Paper read before the Am. Gas Inst.) (86) Dec. 3; (24) Dec. 22.
- Method and Cost of Manufacturing Sand Cement at the Lahontan Dam with Results of Tests of the Modified Cement.* L. E. Sale. (86) Dec. 3.
- Another Rotary High-Vacuum Air Pump.* (13) Dec. 4.
- An Angle-Compound Air Compressor.* (13) Dec. 4.
- An Unusual Hardening Plant.* Ethan Viall. (72) Dec. 4.
- Automatic Railways (for material-handling).* Reginald Trauttschold. (96) Dec. 4.
- Motor-Cycle and Cycle-Car Design.* (11) Dec. 5.
- Increasing the Power of Petrol Engines.* Douglas P. Muirhead. (11) Dec. 5.
- The Recovery of Benjol from Coke Oven Gas, Kopper's Process.* (57) Dec. 5; (22) Dec. 5.
- The Condensation of Gasoline from Natural Gas. George A. Burrell and Frank M. Seibert. (Paper read before the Am. Chemical Soc.) (11) Dec. 6.
- Gas Versus Fuel Oil. Harold L. Alt. (24) Dec. 8.
- Some Notes on Illumination by Low Pressure Gas.* J. W. Thornley. (Paper read before the Manchester and District Junior Gas Assoc.) (66) Dec. 9.
- Tropical Feed-Water Filter Plant (for Boilers).* C. Carlton Semple. (64) Dec. 9.
- The Development of Improved Gas-Heating Appliances.* C. E. Lucke. (Abstract from *Journal of Industrial and Engineering Chemistry*.) (13) Dec. 11.
- Corrosion of Pipe in Refrigerating Systems.* F. N. Speller. (Paper read before the Am. Soc. of Refrigerating Engrs.) (20) Dec. 11; (101) Dec. 26.
- Cast Iron for Machine-Tool Parts. Henry M. Wood. (72) Dec. 11.
- Making a Centrifugal Pump Casing.* D. Gordon. (72) Dec. 11.
- The Design of Medium Sized Coal Gas Plants.* Gordon Kribs. (96) Dec. 11.
- The Williams Connecting Rod System.* (12) Dec. 12.
- Testing Insulating Material for Heat Loss. J. A. Moyer. (Abstract of paper read before the Inter. Congress of Refrigeration.) (101) Dec. 12.
- Comparative Costs of Operating Ice Factory by Oil Engines and Electric Motors.* C. E. Rose. (27) Dec. 13.
- Some of the Physical Characteristics of Ferric Oxide.* W. H. Fulweiler and A. F. Kunberger. (Paper read before the Am. Gas Inst.) (24) Dec. 15.
- Street Main Standards. G. I. Vincent. (Paper read before the Am. Gas Inst.) (24) Dec. 15.
- Characteristics of Basic Coke. J. R. Campbell. (Paper read before the Coal Min. Inst. of America.) (62) Dec. 15.
- Stationary-Boiler Pop Safety Valves.* Warren O. Rogers. (64) Dec. 16.
- Taplay's Combustion Gas Analyzer.* J. G. Taplay. (66) Serial beginning Dec. 16.
- The Birmingham Coal-Testing Works.* E. W. Smith and G. C. Pearson. (Paper read before the Midland Junior Assoc.) (66) Dec. 16.
- How to Make Enamel Brick.* R. T. Stull. (76) Dec. 16.

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- Chart for Journal Bearings.* Axel K. Pedersen. (72) Serial beginning Dec. 18.
- Suction Conveyors.* Reginald Trauttschold. (96) Dec. 18.
- The Future of Oil Fuel. Boverton Redwood. (Paper read before the Junior Institution of Engrs.) (47) Serial beginning Dec. 12; (12) Dec. 19.
- The American Locomobile. George S. Cooper. (Abstract of paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (17) Dec. 20; (27) Dec. 20; (64) Dec. 16.
- Storage of Oil Fuel.* R. T. Strohm. (27) Dec. 20.
- The Koppers Combination Coke and Gas Oven.* (From the *Gas World*.) (24) Dec. 22.
- Open-Hearth Furnace Design and Manipulation as Adapted to Foundry Work.* John H. Floehn. (Paper read before the Am. Foundrymen's Assoc.) (62) Dec. 22.
- Complaints, Their Treatment, and Some Notes on Underground Work. Alex. Paterson. (Paper read before the Scottish Junior Gas Assoc.) (66) Dec. 23.
- Data Drawn from Present British Practice in Utilizing the Heat Produced in Refuse Destructors for the Generation of Power. James A. Seager. (86) Dec. 24.
- Elevators: Their Uses and Abuses. B. C. Van Emon. (Paper read before the Technical Soc. of the Pacific Coast.) (96) Dec. 25.
- Producing a 100-Inch Telescope Mirror.* J. Mastella Le Grand. (72) Dec. 25.
- Points in the Construction of Gas-Fired Tempering, Hardening, Annealing and Melting Furnaces.* E. W. Smith and C. M. Walter. (Abstract of paper read before the Institution of Gas Engrs.) (22) Dec. 26.
- Handling, Sampling and Testing of Transformer Oil.* George E. Armstrong. (27) Dec. 27.
- Report of Committee on Progress in Carbonization Methods.* (Paper read before Am. Gas Inst.) (24) Serial beginning Dec. 29.
- Protection of Street Mains by the Intelligent Use of Underground Space. J. A. Gould. (Paper read before the Am. Gas Inst.) (24) Dec. 29.
- Ferranti and His Turbine.* F. R. Low. (64) Dec. 30.
- Air-Compressor Installation and Operation.* E. M. Ivens. (64) Dec. 30.
- Cost of Steam and Gas Power Equipment. A. A. Potter. (64) Dec. 30.
- Tractors and Trailers for Contract Work and General Heavy Hauling.* (86) Dec. 31.
- Motor Trucks in the Dock and Terminal Problems of Large Cities.* Rollin W. Hutchinson, Jr. (9) Jan.
- Waste Wood Utilization. John E. Teeple. (From the *Chemical Engineer*.) (9) Jan.
- The Clinkering of Mixed Coals. R. D. Quickel. (Paper read before the Kentucky Min. Inst.) (45) Jan.
- Specification and Analytical Procedure for 30 per cent. Hevea Rubber Insulating Compound.* (42) Jan.
- Development of Industrial Fuel. John S. Welch. (Paper read before the National Commercial Gas Assoc.) (83) Jan. 1.
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- Good Lubrication the Motor Conserver.* Harry Tripper. (46) Jan. 3.
- The Wright Automatic Stabilizer for Aeroplanes.* Carl Dienstbach. (46) Jan. 3.
- New Plant of the Wheeling Sheet & Tin Plate Co., at Yorkville, O.* (62) Jan. 5; (20) Jan. 1.
- The Abatement of Smoke on Two Continents: A British View. William B. Smith. (Paper read before the Inter. Assoc. for the Prevention of Smoke.) (62) Jan. 5.
- Fabrique de Ciment Portland de Spokane.* (84) Nov.
- Les Voies en Boucle de MM. Pégoud et Chevillard et la Sécurité en Aéroplane.* G. Espitalleir. (33) Nov. 22.
- Les Progrès de l'Automobilisme en 1913; les Salons de l'Automobile, à Paris et à Londres.* F. Drouin. (33) Serial beginning Nov. 29.
- Note sur l'Energie Mécanique Nécessité par la Séparation Physique de Deux Gaz Parfaits.* Henri Brot. (37) Nov. 30.
- L'Introduction du Gaz à l'Eau dans le Gaz d'Eclairage de la Ville de Paris. (33) Dec. 6.
- L'Emploi du Gaz de Fours à Coke Comme Gaz de Ville et sa Distribution à Grande Distance.* A. Grebel. (33) Serial beginning Dec. 13.
- Die autogene Schweissung im Grossbetriebe.* J. Knappich. (48) Nov. 1.
- Neuere Konstruktionen der Firma L. & C. Steinmüller in Gummersbach, Rhld.* Friedrich Münzinger. (48) Nov. 1.
- Verbindung von Kraft- und Heizbetrieben.* A. Schulze. (7) Nov. 8.
- Seilschwebbahnen für den Fernverkehr von Personen und Gütern.* M. Buhle. (48) Serial beginning Nov. 8.
- Die Wertberechnung im Glaserelwesen. Richard Döll. (50) Serial beginning Nov. 27.
- Berechnung von Riemenscheiben mit hoher Umfangsgeschwindigkeit.* Bruno Leinweber. (53) Nov. 28.

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- Lead Smelting Methods and Conditions at Nelson, B. C.* Gordon Sproule. (5) Vol. 27, Pt. 1.
 Notes on Ruff's Carbon-Iron Equilibrium Diagram.* Henry M. Howe. (56) Vol. 44.
 Wittorffs' Iron-Carbon Equilibrium Diagram.* Bradley Stoughton. (56) Vol. 44.
 The Microstructure of Iron and Steel. William Campbell. (56) Vol. 44.
 The Influence of Divorcing Annealing on the Mechanical Properties of Low-Carbon Steel. Henry M. Howe and Arthur G. Levy. (56) Vol. 44.
 Electric Heating and the Removal of Phosphorus from Iron. Albert E. Greene. (56) Vol. 44.
 The Function of Slag in Electric Steel-Refining.* Richard Amberg. (56) Vol. 44.
 The Methods of the United States Steel Corporation for the Commercial Sampling and Analysis of Pig-Iron. J. M. Camp. (56) Vol. 44.
 Developments in Open-Hearth Steel-Practice.* N. E. Maccallum. (56) Vol. 44.
 Methods of Preparing Basic Open-Hearth Steel for Castings. H. F. Miller, Jr. (56) Vol. 44.
 The Effect of High Carbon on the Quality of Charcoal-Iron.* J. E. Johnson, Jr. (56) Vol. 44.
 Notes on Bag-Filtration Plants.* A. Eilers. (56) Vol. 44.
 Development of the American Water-Jacket Lead Blast-Furnace. R. C. Canby. (56) Vol. 44.
 The Development of the Parkes Process (for desilvering lead) in the United States. Ernest F. Eulich. (56) Vol. 44.
 The Constitution and Melting-Points of a Series of Copper Slags.* Charles H. Fulton. (56) Vol. 44.
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 Chemistry of the Reduction Processes in Use at Anaconda, Mont. Frederick Laist. (56) Vol. 44.
 The Sulphatizing-Roasting of Copper-Ores and Concentrates. Utley Wedge. (56) Vol. 44.
 Notes on the Metallography of Alloys.* William Campbell. (56) Vol. 44.
 The Sampling of Gold-Bullion. Frederic P. Dewey. (56) Vol. 44.
 The Concentration of Iron-Ores. N. V. Hansell. (56) Vol. 44.
 New Type of Blast-Furnace Construction.* J. E. Johnson, Jr. (56) Vol. 44.
 Blowing-In a Blast-Furnace.* R. H. Sweetser. (56) Vol. 44.
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 The Wood Flotation Process.* Henry E. Wood. (56) Vol. 44.
 Notes on Titanium and on the Cleansing Effect of Titanium on Cast-Iron. Bradley Stoughton. (56) Vol. 44.
 Alloys of Cobalt with Chromium and Other Metals. Elwood Haynes. (56) Vol. 44.
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 The Nomenclature of the Non-Ferrous Alloys.* C. P. Karr. (Abstract of paper read before the Am. Inst. of Metals.) (47) Nov. 28.
 Smelting at Campo Seco, California.* M. W. von Bernewitz. (103) Dec. 6.
 Lead Smelting at Herculaneum, Missouri.* H. B. Pulsifer. (82) Dec. 13.
 The Electric Furnace in Western Metallurgy. Dorsey A. Lyon and R. M. Keeney. (Abstract of paper read before the Am. Electrochemical Soc.) (82) Dec. 13.
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 Electric Iron Smelting. Jens Orten-Boving. (96) Dec. 18.
 Plant of the Brakpan Mines, South Africa.* S. R. Stone. (82) Dec. 20.
 Slimes Agitation for Cyanidation. Herbert A. Megraw. (16) Dec. 20.
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 The Clam-Shell Filter Press. E. J. Sweetland. (Paper read before the Am. Inst. of Chemical Engrs.) (105) Jan.

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- The Application of Compressed Air to Cyanidation.* Herbert A. Megraw. (9) Jan.
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 La Cimentation par des Ciments Mixtes.* A. Portevin. (32) Oct.
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 Die Erweiterungsbauten des Hochofenwerkes Lübeck.* Ernst Arnold. (50)
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 Ueber die Verwendung der Hochofengase und Koksofengase in anderen Betrieben.*
 K. Ellingen. (50) Dec. 11.

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- The Lewis Air-Cooled Machine Gun.* (12) Dec. 5.
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- Surveying and Sampling Diamond-Drill Holes.* E. E. White. (56) Vol. 44.
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 (57) Nov. 28.
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 Petroleum: Its Genesis and Mining. John Sim, Jr. (Paper read before the
 Scottish Federated Inst. of Min. Students.) (22) Serial beginning Dec. 5.
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 Portable Electric Mine Lamps in Mine Work. H. H. Clark. (Paper read before
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 A Geological Drainage Problem (for the Miami District Mine).* R. R. Heap. (16)
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 Open Stopping on Wide Lodes in Australia. Andrew Fairweather. (Abstract of
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 Air Consumption and Maintenance Costs of Rock Drills. E. G. Izod and E. J.
 Laschinger. (Paper read before the South African Inst. of Engrs.) (86)
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 An Earth Slide at Bellevue, Penn., and Suggestions for Arresting its Further
 Progress.* R. P. Forsberg. (13) Jan. 1.

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- Street and Railway Track Paving with Asphalt Block in a Suburban Town.* Frank
 Chappell. (5) Vol. 27, Pt. 1.
 Tar Paving and Tar Macadam.* Archibald Currie. (5) Vol. 27, Pt. 1.
 Specifications for Brick Pavements.* Committee on Standard Specifications, Am.
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 Specifications for Concrete Pavements, Cement Sidewalks, and Concrete Curb and
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- Report of the Am. Soc. of Mun. Improvements Committee on Municipal Legislation and Finance.* (99) 1912.
- The City Economic. Louis L. Tribus. (99) 1912.
- Standard Forms for Municipal Utilities. A. Prescott Folwell. (99) 1912.
- Report of the Committee, Am. Soc. of Mun. Improvements, on Traffic on Streets and Roads.* (99) 1912.
- The Effect of Traffic on Bituminous Pavements. Isaac Van Trump. (99) 1912.
- Testing Bitumens. Isaac Van Trump. (99) 1912.
- Thermal Effects on Cement-Filled Brick Pavements.* James E. Howard. (99) 1912.
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- Testing Pavements in Detroit.* J. C. McCabe. (99) 1912.
- London Arterial Main Roads. (104) Nov. 28.
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- Paving Progress in Greater Boston. James H. Sullivan. (Paper read before the Boston Soc. of Civ. Engrs.) (1) Dec.
- Twelve Years of Commission Government.* E. S. Bradford. (60) Dec.
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- Crescoted Wood Block Pavements in Springfield, Mass., and New Haven, Conn. (60) Dec.
- Fixed Carbon Depends on Crude. Lester Kirschbraun. (96) Dec. 4.
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- Repair and Maintenance of Various Kinds of Pavement. Chicago, Ill. (13) Dec. 4.
- Types of New York State Roads. W. G. Harger. (13) Dec. 4.
- Small-Cube Pavements of Monroe County; Service Tests and Costs of Two-Inch Blocks of Gravel Concrete, Clay Ash and Vitriified Shale Laid since 1908, near Rochester, N. Y.* W. G. Harger. (14) Dec. 6.
- Experimental Pavement in Philadelphia.* (14) Dec. 6.
- Banff-Windermere Motor Road.* (14) Dec. 6.
- Dynamometer Wagon for Road-Resistance Tests. (14) Dec. 6.
- Proper Inspection of Track Paving. Martin Schreiber. (From the *Journal*, Am. Elec. Ry. Assoc.) (96) Dec. 11.
- Toronto Asphalt Specifications. George C. Powell. (96) Dec. 11.
- New Specifications for New York State Highway Work. (13) Dec. 11.
- Concrete Road in Cook County, Illinois.* (14) Dec. 13.
- Specifications for Pavements Constructed with Bricks Laid Flatwise, or with the Fiber in a Vertical Position. (86) Dec. 17.
- Methods and Costs of Constructing Granite Block Pavements. R. H. Gillespie. (Paper read before the Am. Road Builders' Assoc.) (86) Dec. 17.
- State Highway Work in New York, 1913-14.* (86) Dec. 17.
- A Discussion of Road Location and Construction with Special Reference to Drainage and Protection from Floods. S. D. Foster. (Paper read before the Am. Road Builders' Assoc.) (86) Dec. 17.
- Pavement Requirements in Ottawa. Arch. Currie. (Report to the Board of Control.) (96) Dec. 18.
- American and British Road Tars, Comparative Analysis. W. W. Crosby. (14) Dec. 20.
- Drainage and Maintenance of Earth Roads. E. A. Kingsley. (Paper read before the Am. Road Builders' Assoc.) (86) Dec. 24.
- The Testing of Bituminous Materials for Road and Street Construction, and the Importance of the Relation of Such Tests to Paving Specifications. Prevost Hubbard. (Paper read before the Am. Road Builders' Assoc.) (86) Dec. 24.
- Cost of Concrete Road. B. P. Lampert. (96) Dec. 25.
- The Mining and Quarrying of Materials Used in Road Making. C. Owen Baines. (Paper read before the Institution of Mun. and County Engrs.) (104) Dec. 26.
- A Comparison of the Unit Price, Lump Sum and Percentage Work Forms of Highway Contract on the Basis of Costs and Moral Aspects.* H. C. Hill. (Paper read before the Am. Road Builders' Assoc.) (86) Dec. 31.
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- Bituminous Surface Treatment and Dust Preventatives used in Philadelphia, Penn. William H. Connell. (Abstract of paper read before the Am. Road Builders' Assoc.) (13) Jan. 1; (86) Dec. 31.
- Practicable Measures for Civic Beautification. (Paper read before the Burnaby Board of Trade.) (96) Jan. 1.
- Construction and Maintenance of Roads with Reference to Methods Practised in Scotland. Robert C. Muir. (96) Jan. 1.
- Water in Macadam Road Construction. W. G. Fearnside. (Paper read before the British Surveyors' Inst.) (96) Jan. 1.
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- Recent Developments in the Inspection of Steel Rails. Robert W. Hunt. (56) Vol. 44.
- The Detroit Automatic Train Control.* (23) Sept. 26.
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- The Central Argentine New Terminal Station, Buenos Ayres.* (23) Oct. 3.
- Diesel Locomotive Built by Sulzer Bros.* (23) Oct. 3.
- South African Railways and Harbours. W. W. Hoy. (23) Oct. 10.
- Improvements at Charing Cross Station.* (23) Oct. 10.
- New Passenger and Goods Locomotives for the Glasgow & South-Western Railway.* (23) Oct. 10.
- Railway Work in India. G. C. Godfrey, Assoc. M. Inst. C. E. (Paper read before the London School of Economics.) (23) Oct. 17.
- The New Federal Audible Signal.* (23) Oct. 17.
- Signalling and Interlocking at Snow Hill Station, Birmingham, Great Western Railway.* H. E. Cox. (23) Oct. 24.
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- The Restaurant Cars of the Great Eastern Railway.* (23) Oct. 31.
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- Systems of Electrification. W. B. Potter. (From the *General Electric Review*.) (23) Nov. 14.
- Electrification of the Melbourne Suburban Railways.* (23) Nov. 21.
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- 4-6-0 Passenger Type Locomotives for the Nigerian Railway.* (23) Nov. 21.
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- The Rate Advance Hearing. (Papers read before the Interstate Commerce Comm.) (18) Serial beginning Nov. 29; (15) Dec. 12.
- Experience with High Water on Track.* O. A. McCombs. (87) Dec.
- Electric Railway from Maestricht to Aix-la-Chapelle.* (Abstract from *Allgemeine Elektrizitäts-Gesellschaft*.) (88) Dec.
- Jeffery Shops of the Western Pacific.* W. E. Johnston. (87) Dec.
- The Possibilities of Flash Signalling in British Railway Practice.* J. F. Gairns. (87) Dec.
- New Goods Locomotive, Northern Railway of France.* (21) Dec.
- Rochester Passenger Station, N. Y. C. & H. R. R. R.* (87) Dec.; (14) Dec. 13.
- The Over Rail Facing-Point Locking Bar.* (21) Dec.
- The Results of Working the Main Railroads in France, in England and in Germany during 1911, 1912. C. Colson. (From *Revue politique et parlementaire*.) (88) Dec.
- Honduras Link of the Pan-American Railroad.* Edward Perry. (9) Dec.
- Should Rates be Based on Depreciated Plant Values? Halbert P. Gillette. (Paper read before the Public Service Comm. of Washington.) (86) Dec. 3.
- Railway Economics. J. L. Busfield and W. H. Abbott. (96) Dec. 4.
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- The Darjeeling Himalayan Railway.* Lewis R. Freeman. (23) Dec. 5.
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- The Railway Employee and the Railway Patron. Samuel O. Dunn. (Abstract of paper read before the Traffic Club of Chicago.) (15) Dec. 5.
- Summit-Hallstead Cut-Off of D. L. & W.* (15) Dec. 5.
- Some Data on Earth Excavation. E. W. Robinson. (14) Dec. 6.
- Consolidation Locomotives for the Wheeling & Lake Erie R. R.* (18) Dec. 6.
- Electrification of the Chicago, Milwaukee & St. Paul; Notes on Plan to Substitute Electricity for Steam in Operating over the Heavy Grades in the Rocky Mountains. (14) Serial beginning Dec. 6; (17) Jan. 3; (15) Jan. 2.
- Lunch Counter Car, Pennsylvania R. R.* (18) Dec. 6; (25) Jan.
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 Railway Efficiency. A Crumpton. (Paper read before the Canadian Ry. Club.) (18) Dec. 13; (86) Dec. 24.
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 Railway Buying and General Prosperity.* E. B. Leigh. (Paper read before the Ry. Business Assoc.) (15) Dec. 19.
 Government Ownership and the Railway Employee. J. K. Turner. (Abstract from the *Mediator.*) (15) Dec. 19.
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 Troy Union Station Depressed Concourse; First New York Central Enlargement and Adaptation of the Pedestrian Subway to Serve as an Auxiliary Waiting Room.* J. R. Taft, Assoc. M. Am. Soc. C. E. (14) Dec. 20.
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 Long Life of Lignum Vitæ Ties on the Panama Railroad. F. Mears. (From the *Canal Record.*) (86) Dec. 24.
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 Sewerage and Sanitation. E. L. Dalton. (99) 1912.
 Sanitary Problems of the Small City. Clark G. Anderson. (99) 1912.
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 A Method of Supporting Sewers in Deep Fills. C. A. Baumgartner. (99) 1912.
 Cement Pipe for Sanitary Sewers. T. C. Hughes. (99) 1912.
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 Notes on the Case-Hardening of Special Steels.* Albert Sauveur and G. A. Reinhardt. (56) Vol. 44.
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